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C.1

A-10 CARRIAGE LOADS TEST

T. O. Shadow
ARO, Inc., AEDC Division
A Sverdrup Corporation Company
Propulsion Wind Tunnel Facility
Arnold Air Force Station, Tennessee

Period Covered: May 26 through June 3, 1978

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Reviewed By:

GREGORY COWLEY, 1st Lt, USAF
Test Director, PWT Division
Directorate of Test Operations

Approved for Publication:
FOR THE COMMANDER

CHAUNCEY D. SMITH, JR, Lt Colonel, USAF
Director of Test Operations
Deputy for Operations

Prepared for: Air Force Armament Laboratory (DLJCE)
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ARNOLD ENGINEERING DEVELOPMENT CENTER
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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

A wind tunnel test was conducted with a 0.05-scale model of the A-10 aircraft to obtain carriage loads data for various external store configurations. The external stores consisted of 14 different bombs and pods, four different loading racks, and three 600-gal ferrying tanks mounted in various combinations on all 11 pylons. The loads imposed by the stores on the pylons were measured on six of the 11 pylons with strain-gage balances mounted inside the pylons. Mach number was varied from 0.3 to 0.75 and aircraft sideslip angle was varied from -18 to 18 deg at constant angles of attack of 0, 5, 10, 15, and 20 deg.

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NOMENCLATURE

ALFA	Model angle of attack relative to the aircraft waterline, deg
ALFI	Support system angle of attack relative to the wind tunnel centerline, deg
BETA	Model angle of sideslip
BL	Aircraft model buttline, in.
CLL	Store rolling-moment coefficient, rolling moment/QSd
CN	Store normal-force coefficient, normal force/QS
CLM	Store pitching-moment coefficient, pitching moment/QSd
CLN	Store yawing-moment coefficient, yawing moment/QSd
CONF	Store loading configuration (Fig. 5)
CY	Store side-force coefficient, side force/QS
d	Store reference length (Table 2), ft
FS	Aircraft model fuselage station, in.
MACH, M_∞	Free-stream Mach number
MER	Multiple ejection rack
MSER	Multiple store ejection rack
P	Free-stream static pressure, psfa
PART	Part number
PHII	Support system roll angle, deg
PT	Free-stream total pressure, psfa
Q	Free-stream dynamic pressure, psf
R	Reynolds number, per ft
S	Store reference area (Table 2), ft^2
TER	Triple ejection rack

TEST Test Number

TP Test point

TRL Triple rail launcher

TT Free-stream total temperature, °F

WL Aircraft model waterline, in.

XCP Store center of pressure, C_m/C_N, store reference lengths

XMR Distance from store nose to the moment reference point (Table 2), in.

ZMR Distance from store centerline to the rolling moment reference point (Table 2), in.

COEFFICIENT SIGN CONVENTIONS, AS SEEN BY PILOT

CN Positive up

CY Positive along right wing

CLM Positive nose up

CLN Positive nose right

CLL Positive right wing down

Note: See Table 2 for reference dimensions and moment reference points.

1.0 INTRODUCTION

A wind tunnel test was conducted to measure loads on stores mounted in the carriage position on a 0.05-scale model of the A-10 aircraft. The A-10 model was wind tunnel tested without installation of the Pave Penny pod and pylon. Six of the 11 A-10 pylons were equipped with internal strain-gage balances, each of which measured five-component force and moment data. Thirty-six configurations consisting of 15 different store models and four different loading racks mounted in various combinations on all 11 pylons were tested. Each configuration was tested at Mach numbers 0.3, 0.5, 0.65, and 0.75 at sideslip angles from -18 to 18 deg for constant angles of attack of 0, 5, 10, 15, and 20 deg. One symmetrical configuration (Configuration 30) was chosen to check for Reynolds number and aerodynamic hysteresis effects.

The work reported herein was conducted at the Arnold Engineering Development Center (AEDC), Air Force Systems Command (AFSC) at the request of the Air Force Armament Laboratory (AFATL/DLJCE), Eglin Air Force Base, Florida, under Program Element 65807F. The AFATL project monitor was Dr. Larry Lijewski. The test results were obtained by ARO, Inc., AEDC Division (a Sverdrup Corporation Company), contract operator of AEDC, AFSC, Arnold Air Force Station, Tennessee. The test was conducted from May 26 through June 3, 1978, under ARO Project Number P41C-22.

The final data have been transmitted to the Air Force Armament Laboratory (AFATL/DLJCA), Eglin Air Force Base, Florida. Requests for these data must be referred to the Air Force Armament Laboratory (AFATL/DLJCE), Eglin Air Force Base, Florida, 32542. A copy of the final data is on file on microfilm at AEDC.

2.0 APPARATUS

2.1 TEST FACILITY

The Aerodynamic Wind Tunnel (4T) is a closed-loop, continuous flow, variable-density tunnel in which the Mach number can be varied from 0.1 to 1.3 and can be set at discrete Mach numbers of 1.6 and 2.0 by placing nozzle inserts over the permanent sonic nozzle. At all Mach numbers, the stagnation pressure can be varied from 300 to 3,700 psfa. The test section is 4 ft square and 12.5 ft long with perforated, variable porosity (0.5- to 10-percent open) walls. It is completely enclosed in a plenum chamber from which the air can be evacuated, allowing part of the tunnel airflow to be removed through the perforated walls of the test section. The model support system consists of a sector and sting attachment which has a pitch angle capability of -7.5 to 28 deg with respect to the tunnel centerline and a roll capability of -180 to 180 deg about the sting centerline. A more complete description of the tunnel may be found in the Test Facilities Handbook.[1]

2.2 TEST ARTICLES

The 0.05-scale A-10 model and its associated hardware dimensions and details are presented in Figs. 1 through 3. The A-10 model has adjustable flaps, ailerons, speed brakes, elevators, and rudders, however, during this test all control surfaces were set to zero or the neutral position. Pylons 1, 3, 5, 6, 8, and 10 were equipped with balances (Fig. 3). The balances were fixed in the pylons with screws and pins and remained on the aircraft during the entire test. The remaining dummy pylons (2, 4, 7, 9, and 11) were also affixed to the aircraft at all times. The 0.05-in. gap (Fig. 3) between the store and pylons that was present on the metric pylons was simulated on all dummy stores and racks with 0.05-in.-thick spacers at the attachment points. Details and dimensions of the external stores and racks are shown in Fig. 4. Figure 5 provides a key by which the various configurations are identified.

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[1] Test Facilities Handbook (Tenth Edition). "Propulsion Wind Tunnel Facility, Vol. 4." Arnold Engineering Development Center, May 1974.

2.3 TEST INSTRUMENTATION

Test instrumentation consisted of five-component carriage load balances within pylons 1, 3, 5, 6, 8, and 10 and an angular position indicator (API) for measuring the model attitude. The carriage load balances are an integral part of the pylons, and the loading racks or stores mount directly to the balance such that the balance measures the loads transmitted to the pylon by the rack or store. Because of space constraints, axial-force links could not be incorporated into the carraige load balances and hence, axial-force loads of the various store configurations could not be determined. The API consists of a strain gaged pendulum, encased in oil to damp out unwanted vibrations, that delivers an output proportional to model attitude. In this case, the model was not only pitched but also rolled and hence, the API was calibrated over a range from -20 to 20 deg in pitch and from -180 to 180 deg in roll. The balance and model attitude data were input into the PWT digital computer for online data reduction and display.

3.0 TEST DESCRIPTION

3.1 TEST CONDITIONS AND PROCEDURES

Carriage loads force and moment data were obtained using the pitch-pause technique to incrementally vary the A-10 model angle of sideslip while holding Mach number, total pressure, and angle of attack constant. The angle-of-sideslip range was -18 to 18 deg at Mach number 0.3, -15 to 15 deg at Mach number 0.5, and -12 to 12 deg at Mach numbers 0.65 and 0.75 while holding angle of attack constant at 0, 5, 10, 15, or 20 deg. In addition, an angle-of-attack sweep from 0 to 20 deg with sideslip angle zero was made at each Mach number. The combined attitude polars were run automatically using online computer facilities which set the model pitch and roll angles to give the prescribed values at angle of attack and sideslip.

Additional data were taken to ascertain the effects of Reynolds number and aerodynamic hysteresis. Unit Reynolds number was varied from 0.73×10^6/ft to 2.44×10^6/ft at Mach number 0.3, 1.14×10^6 to 2.75×10^6/ft at Mach number 0.5, and 1.51 to 3.58×10^6/ft at Mach number 0.75. Aerodynamic hysteresis was checked by varying angle of attack and sideslip through a complete positive and negative sweep cycle. A summary of the nominal test conditions set during the test is shown in Table 1.

The data were continuously monitored with the Tunnel 4T GT-42 real time graphics display. In addition, the data were also transmitted to the AEDC IBM-370/165 graphics system whereby the data could be recalled on the Tunnel 4T control room graphics terminal for analysis during the test. Examples of the graphics plots are presented in Fig. 6. Plots like these were used to identify Reynolds number and aerodynamic hysteresis effects on Configuration 30 and to monitor data consistency throughout the test.

3.2 DATA REDUCTION AND CORRECTIONS

The carriage loads force and moment data were reduced to coefficient form in the pylon-axis coordinate system. Pitching and yawing moments were referenced to a point midway between the store/rack mounting lugs on the balance centerline. Rolling moment was referenced to a point midway between the store/rack mounting lugs on the pylon lower surface. Pitching and yawing moments could not be transferred off the balance centerline since axial force was not measured for the reasons given in Section 2.3. With an estimated axial force, the pitching and yawing moments can be referenced about any other point with the following equations:

$$CLM(TRANSFERRED) = CLM(TABULATED) + x\ CN/d + z\ CA(EST)/d$$

$$CLN(TRANSFERRED) = CLN(TABULATED) + x\ CY/d - y\ CA(EST)/d$$

$$CLL(TRANSFERRED) = CLL(TABULATED) + y\ CN/d + (z - 0.18)CY/d$$

where x, y, and z are the distances along the store (pylon) axis from the pitch and yaw moment reference point to the desired reference point, and are positive in the aft, out right wing, and downward directions. CA(EST) is the estimated axial-force coefficient for the store of interest (positive downstream). A summary of the reference lengths, areas and moment reference points for each of the stores and mounting racks is given in Table 2.

Flow angle corrections were not determined during this test since no main aircraft balance was present. However, the model attitude was corrected using average values obtained during previous aircraft tests. The values of flow angle corrections used were 0.64 deg at M_∞ = 0.3, 0.51 deg at M_∞ = 0.5, 0.41 deg at M_∞ = 0.65 and 0.35 deg at M_∞ = 0.75. Corrections for the components of model weight, normally termed static tares were also applied to the data.

3.3 UNCERTAINTY/PRECISION OF MEASUREMENT

The balance and instrumentation system uncertainties, based on a 95-percent confidence level, were combined with the uncertainties in the tunnel parameters, using a Taylor series approximation for error propagation, to estimate the uncertainties of the tunnel parameters and the aerodynamic coefficients. Representative uncertainties determined in tunnel parameters and aerodynamic coefficients are given in Table 3. The calculations shown are for the 600-gal ferrying tank mounted on pylon 6. The balance calibration uncertainties were approximately the same for all balances, hence, when reference areas and lengths are accounted for, the coefficient uncertainties shown are typical of all store and balance combinations. The precision in setting and maintaining a specific Mach number was ±0.005. The uncertainty in model angle of attack was ±0.1 and in model roll angle was ±0.4 deg.

4.0 DATA PACKAGE PRESENTATION

A summary of the test program listing part numbers for each test condition is presented in Table 4. A sample of the summary data tabulations is given in Table 5.

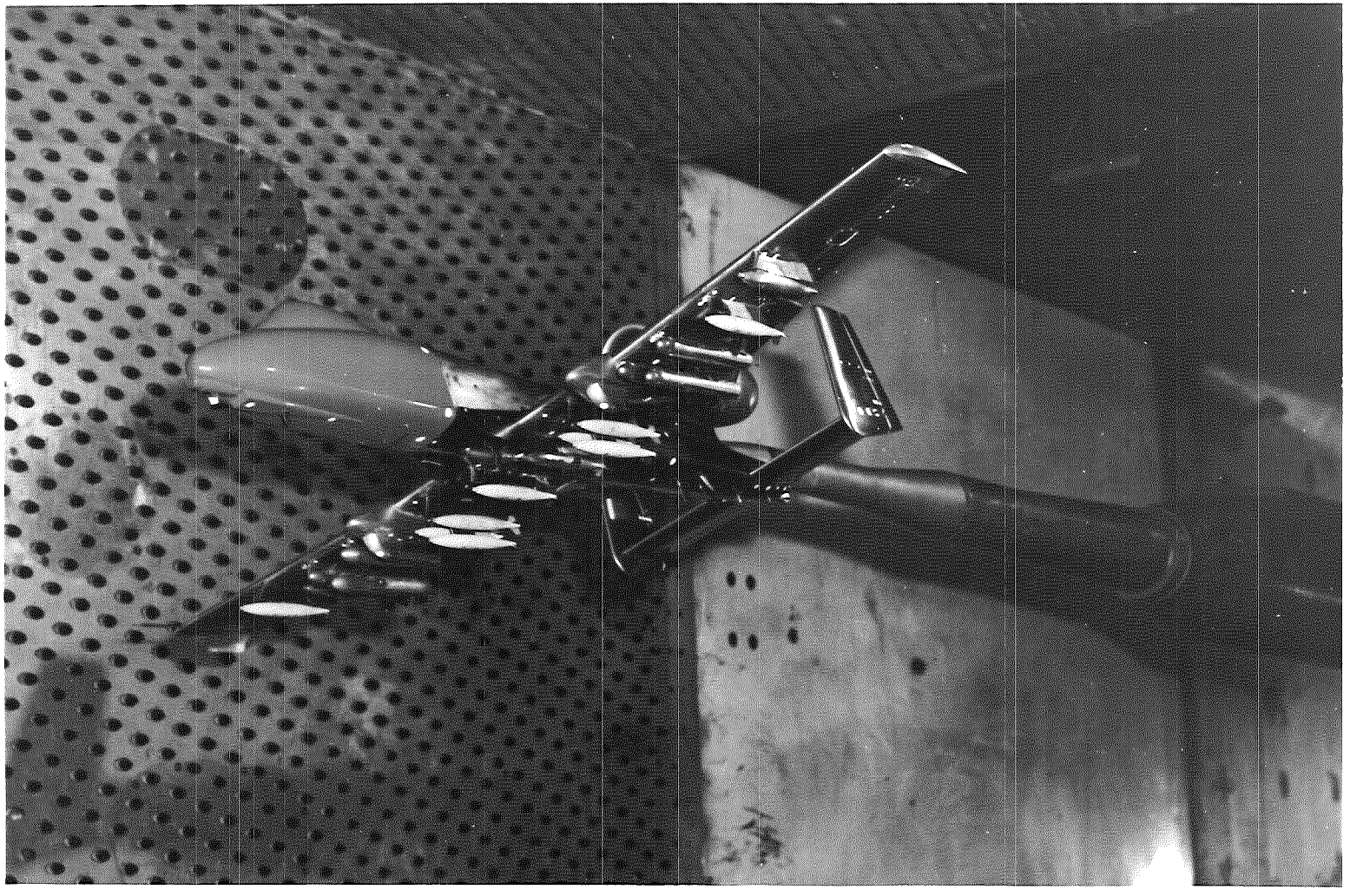


Figure 1 Tunnel Installation of Configuration 30

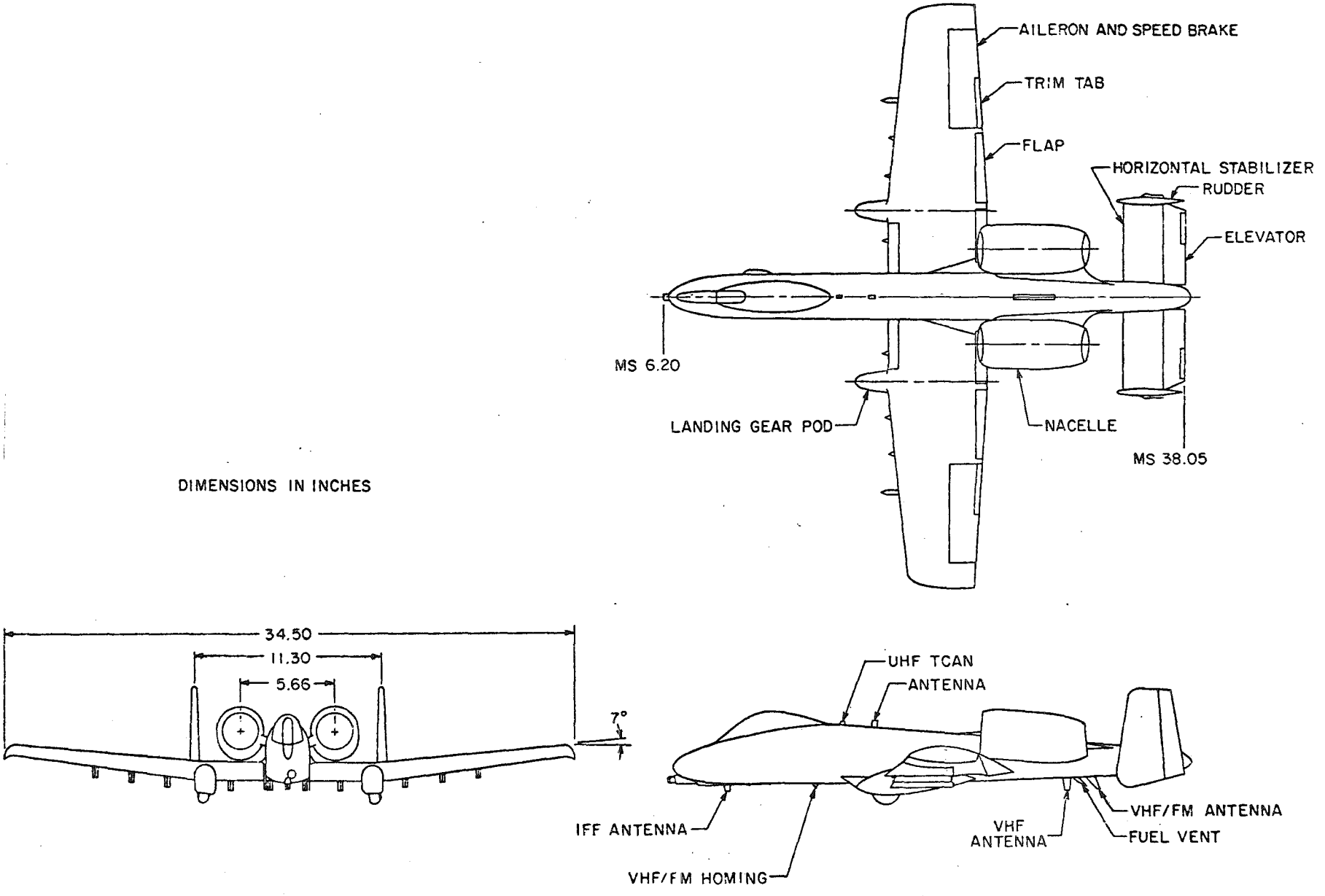
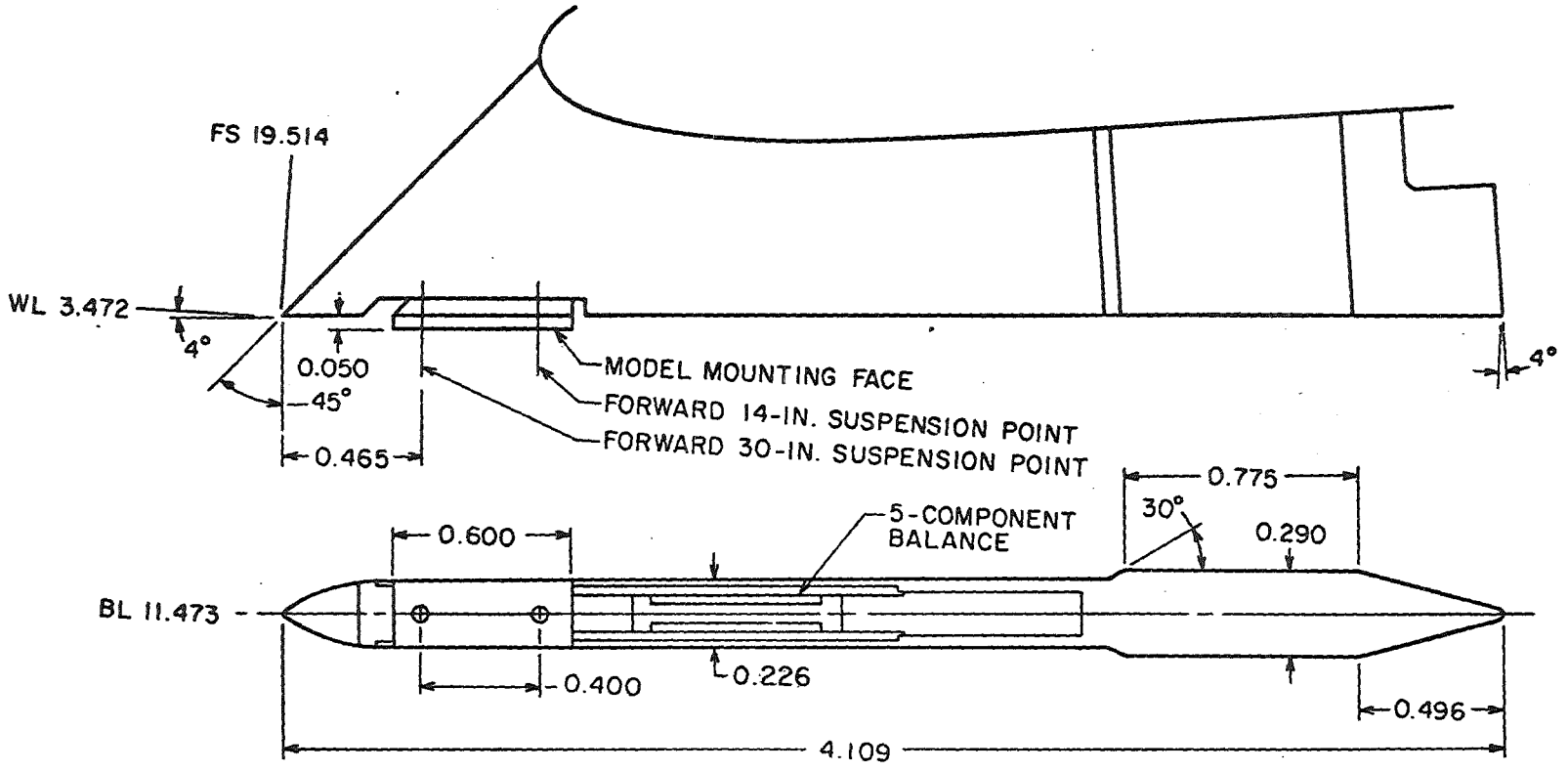
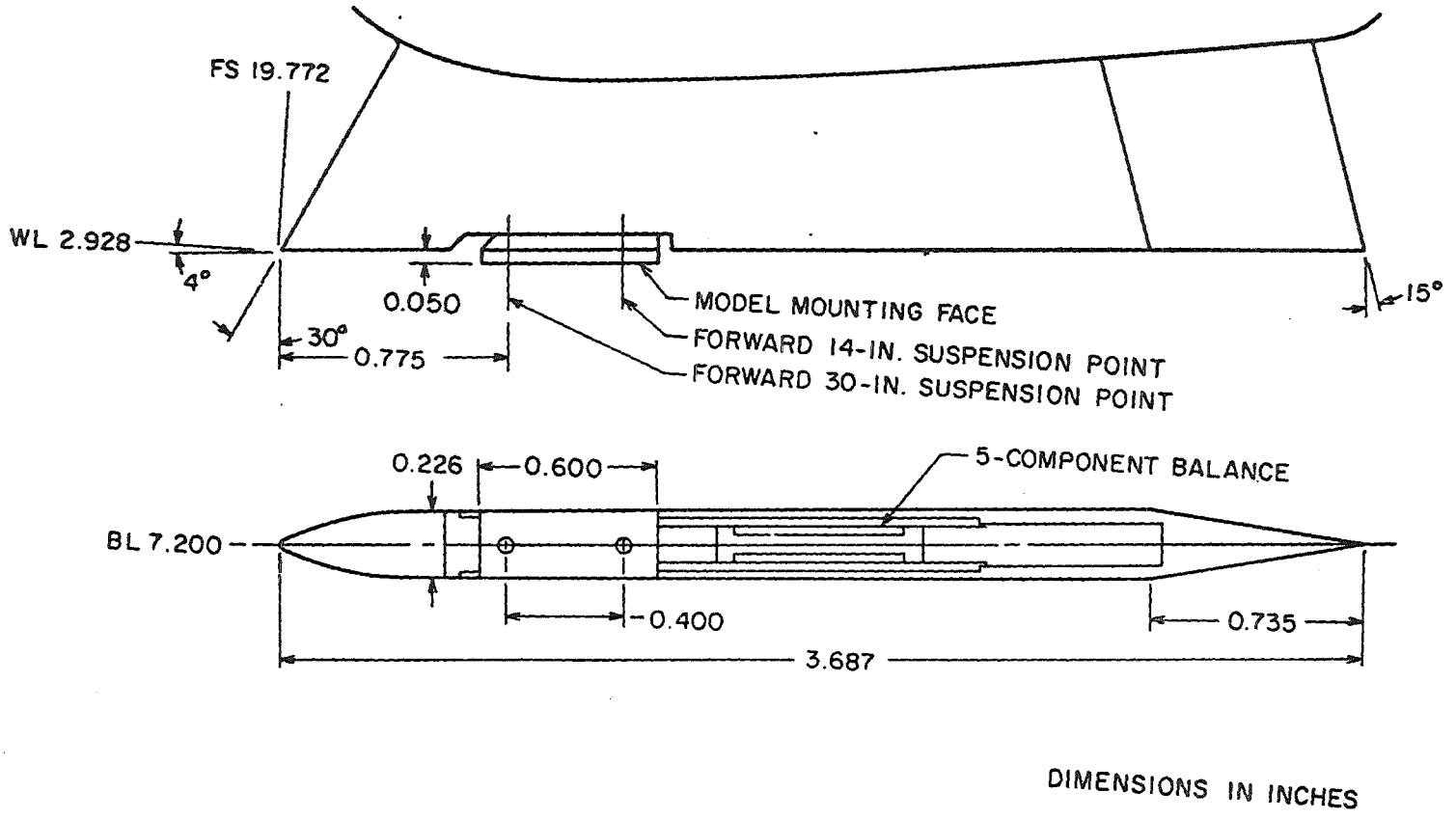


Figure 2 0.05-Scale A-10 Model



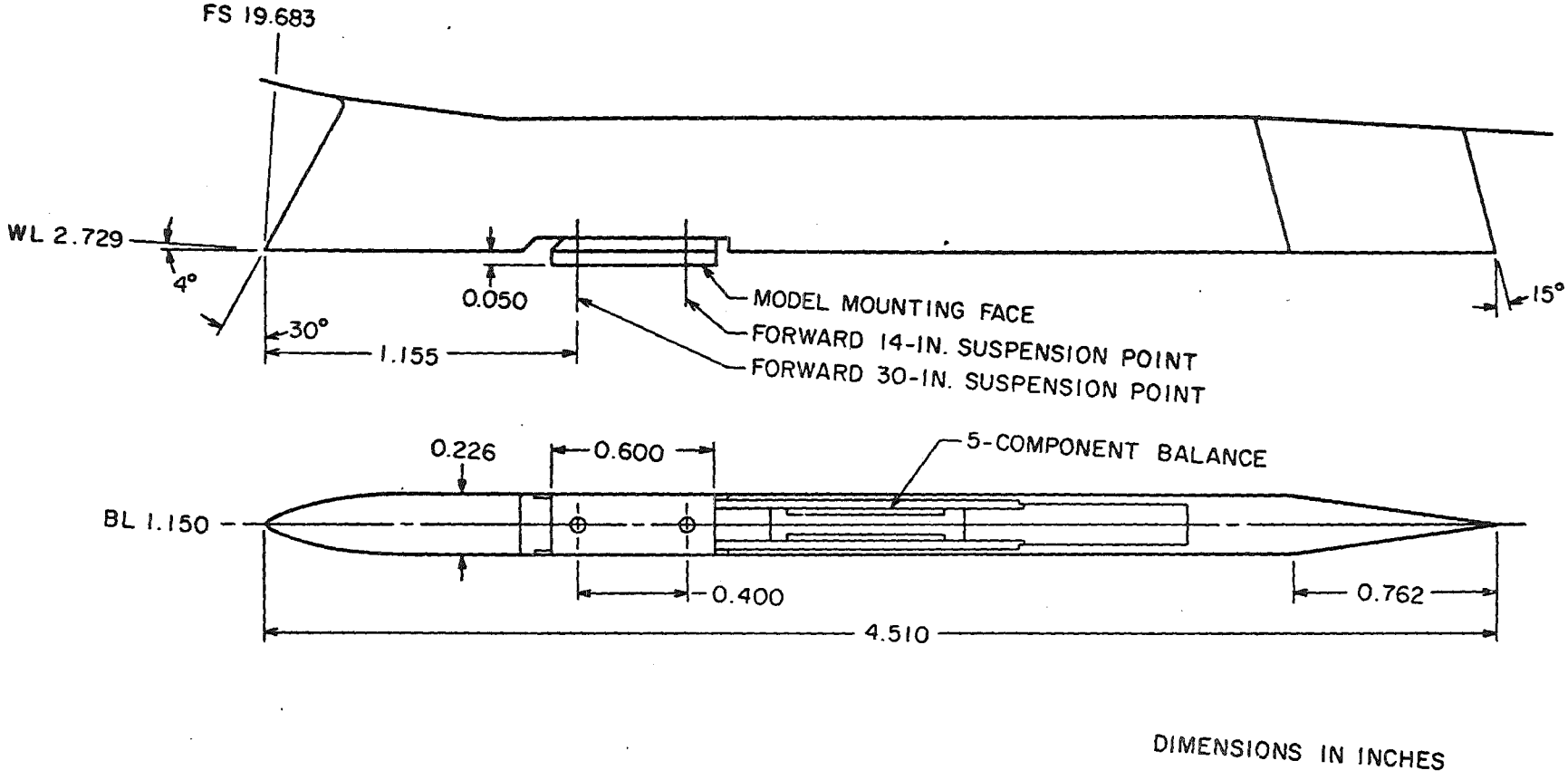
a. Pylon 1

Figure 3 A-10 Pylon Details



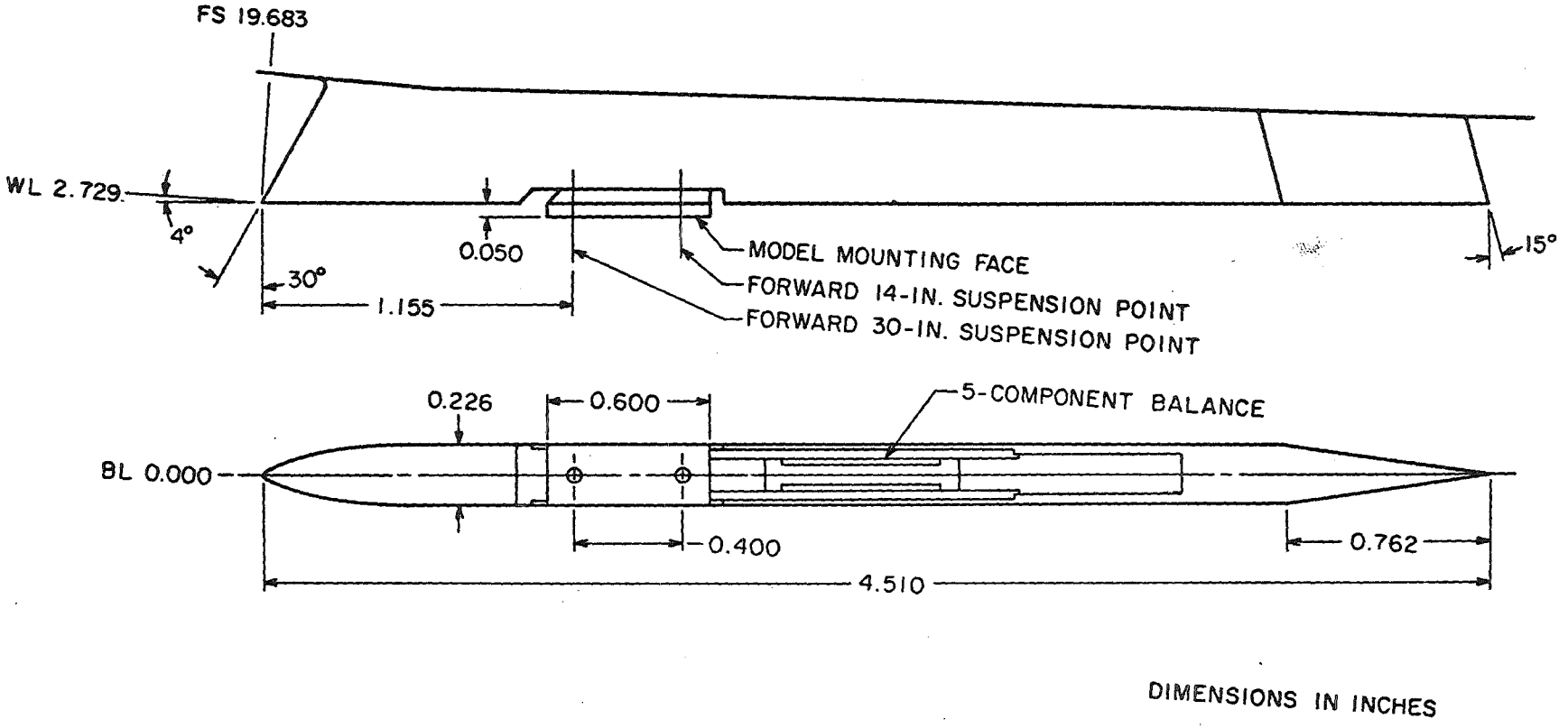
b. Pylon 3

Figure 3 Continued



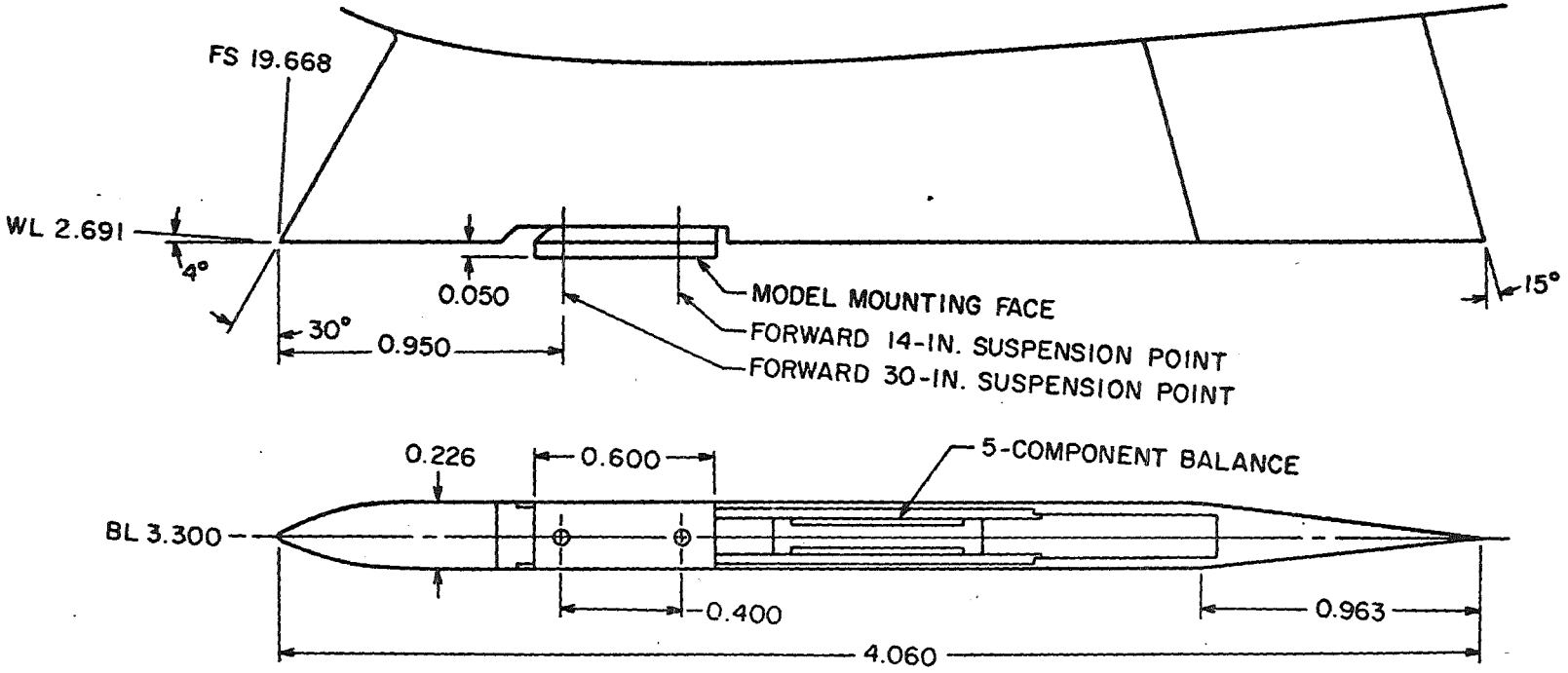
c. Pylon 5

Figure 3 Continued



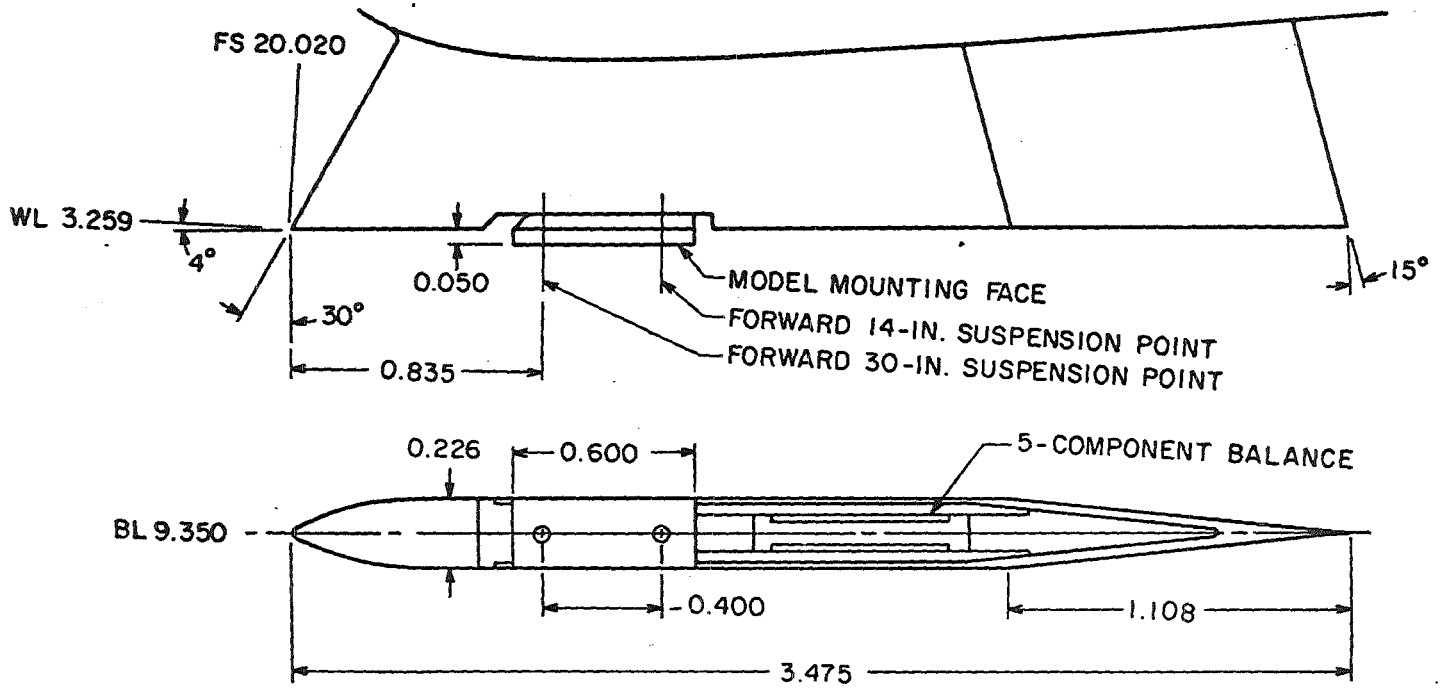
d. Pylon 6

Figure 3 Continued



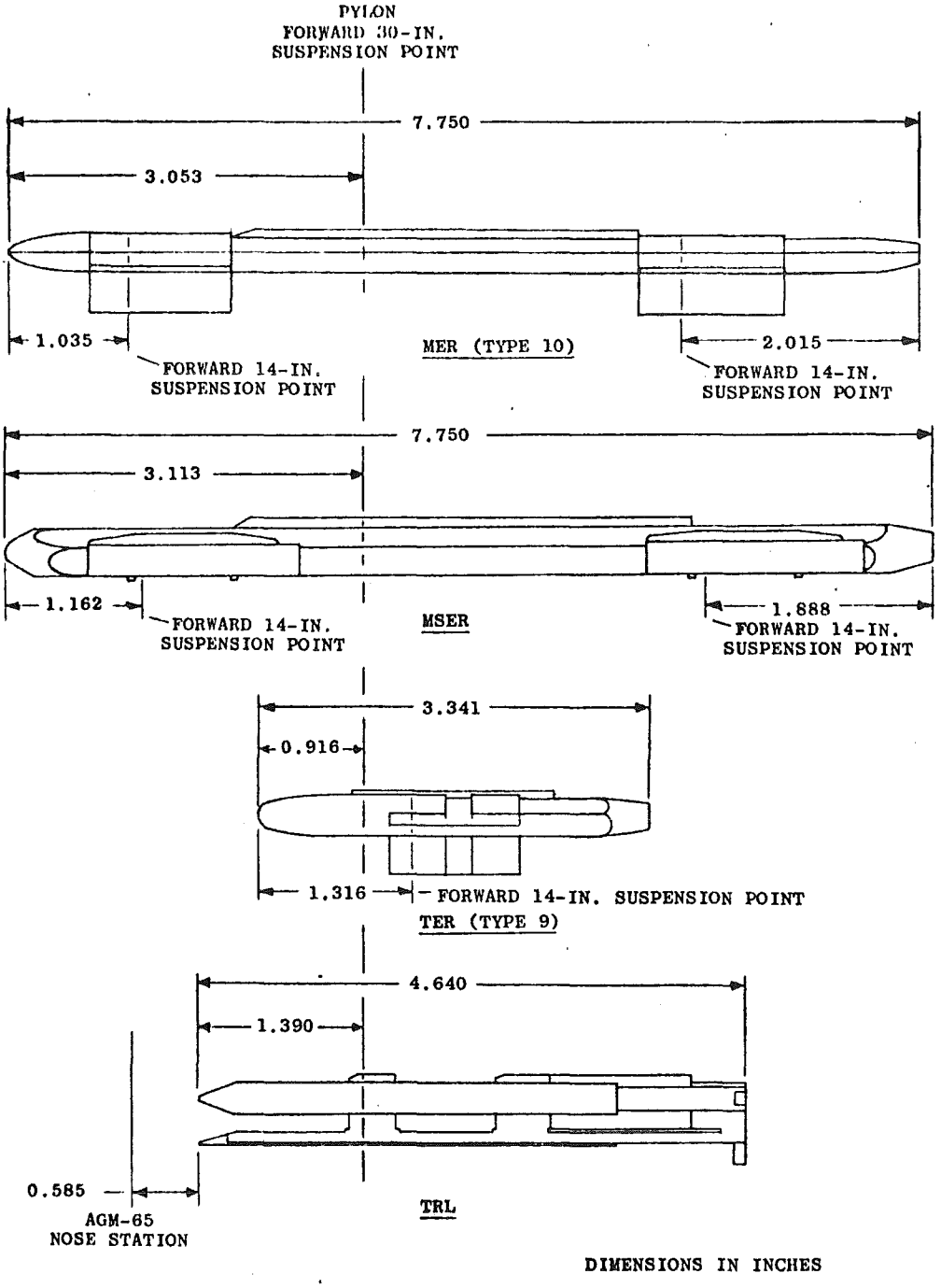
e. Pylon 8

Figure 3 Continued



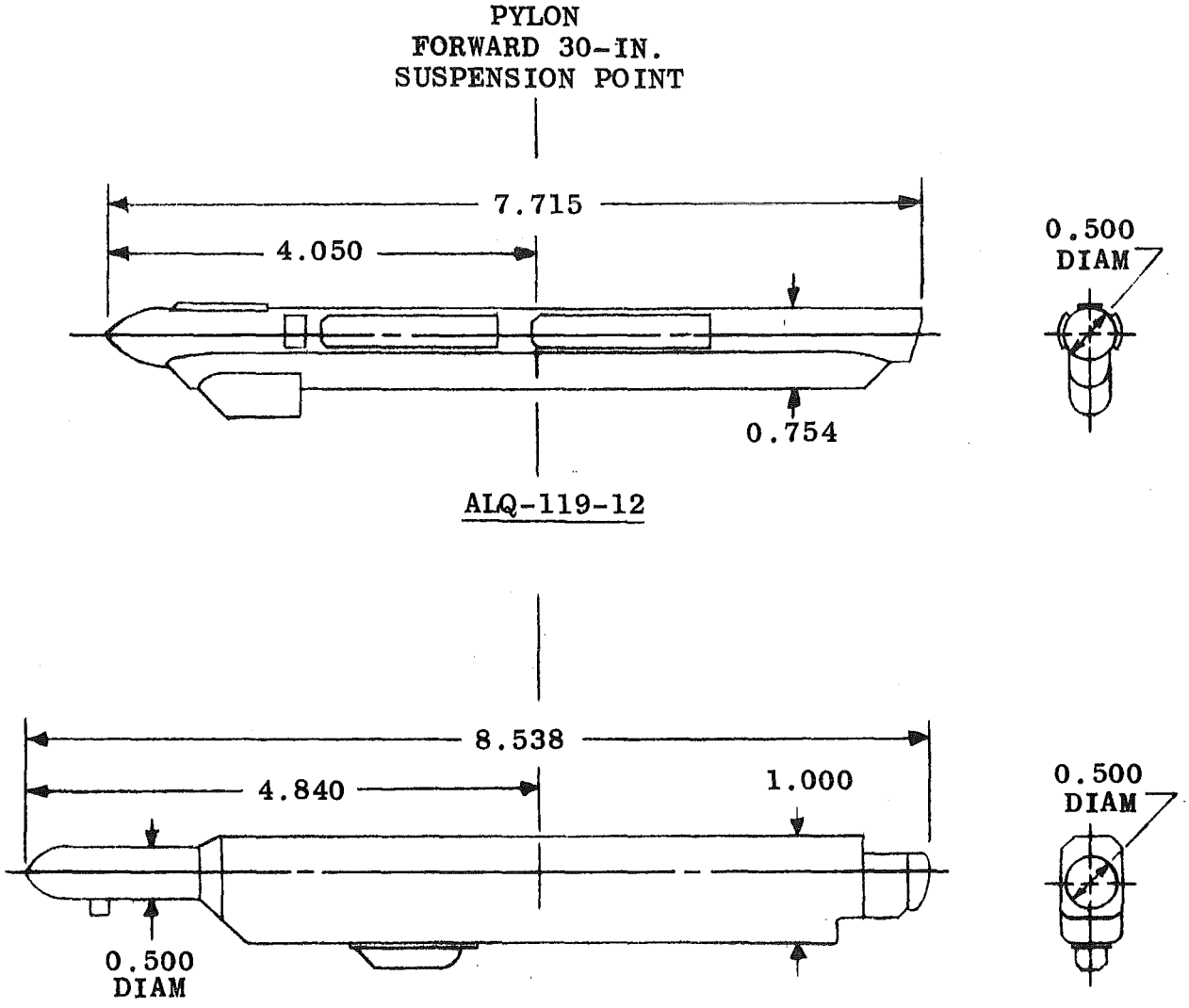
f. Pylon 10

Figure 3 Concluded



a. Racks

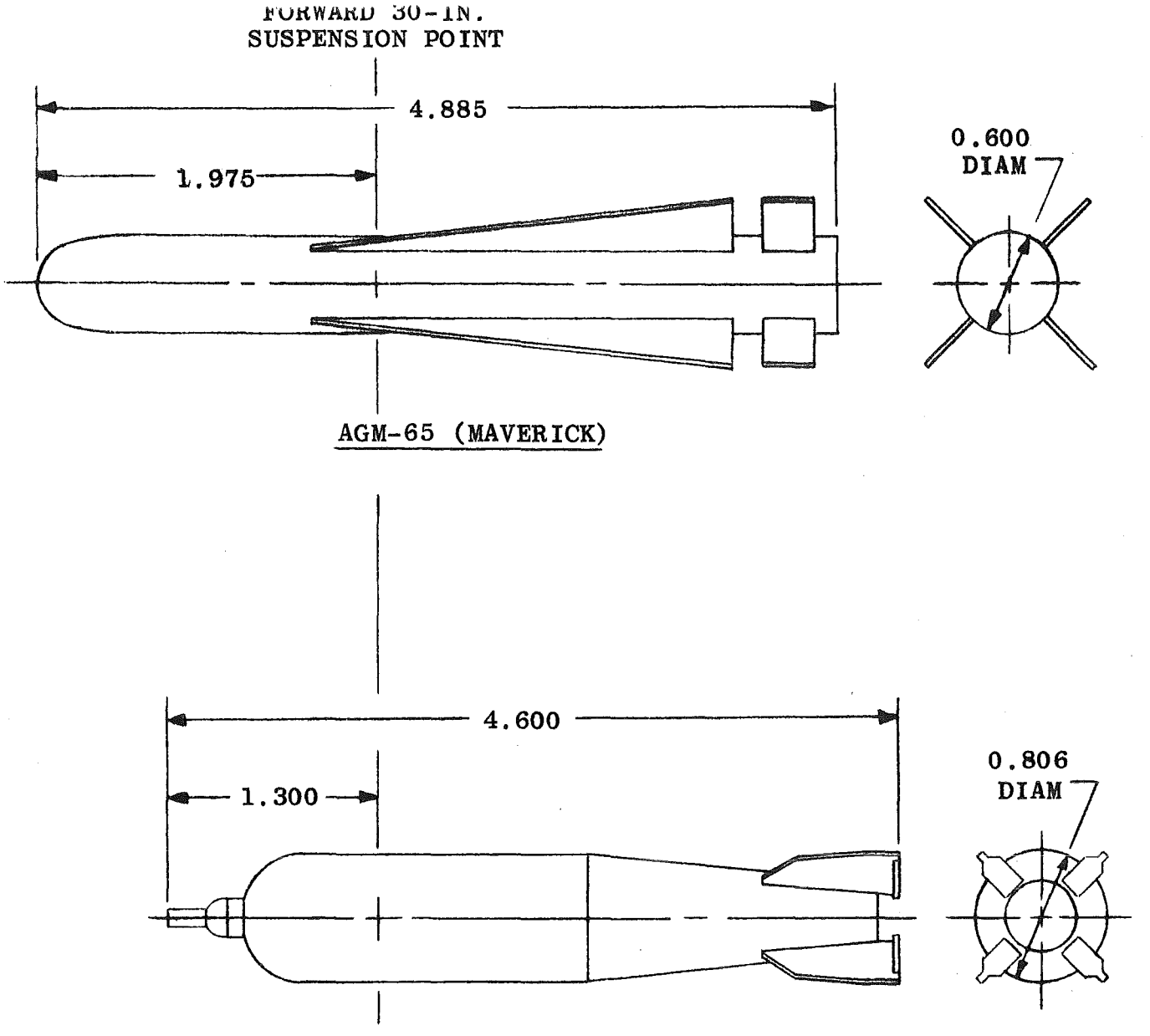
Figure 4 0.05-Scale External Stores and Racks



DIMENSIONS IN INCHES

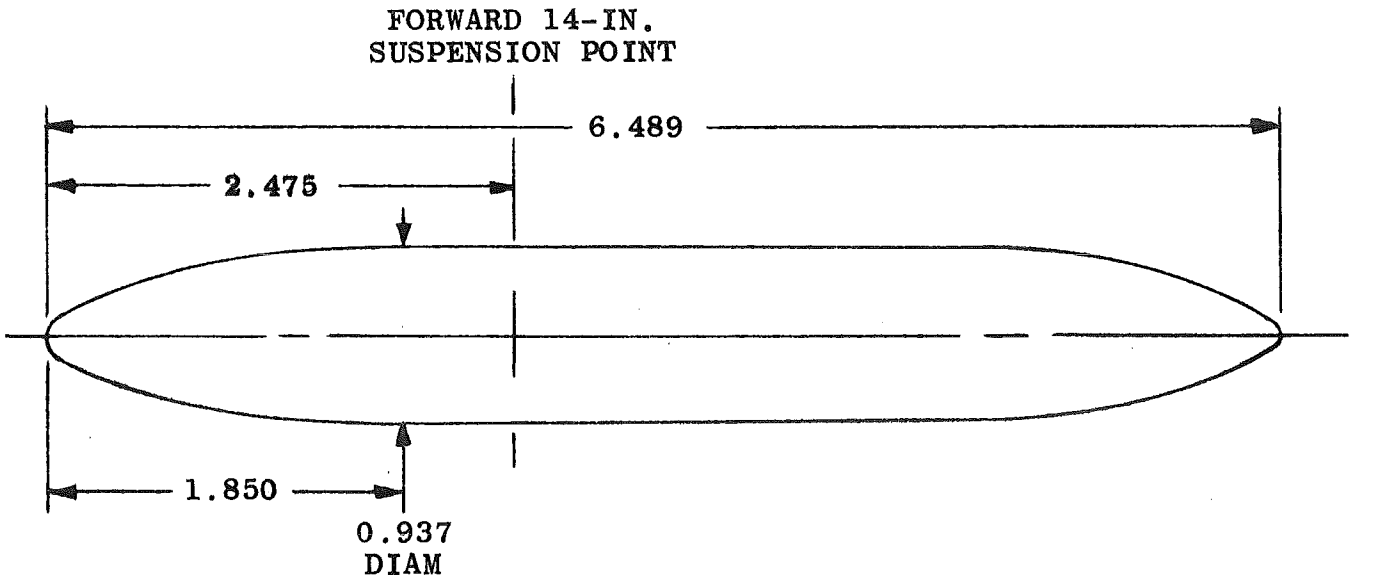
b. ECM Pods

Figure 4 Continued

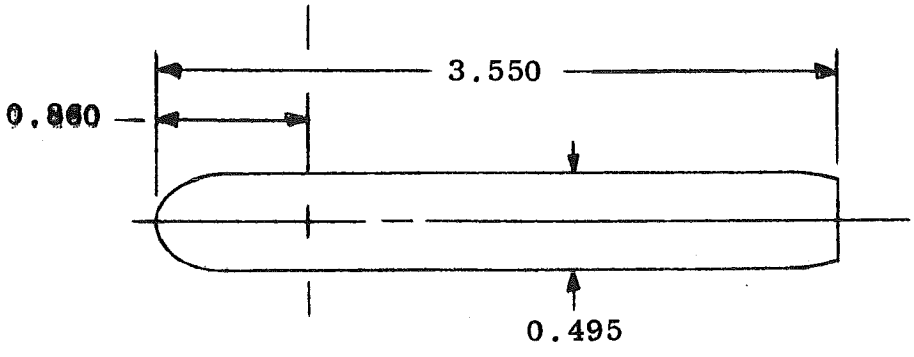


c. AGM-65 and SUU-30 (H/B)

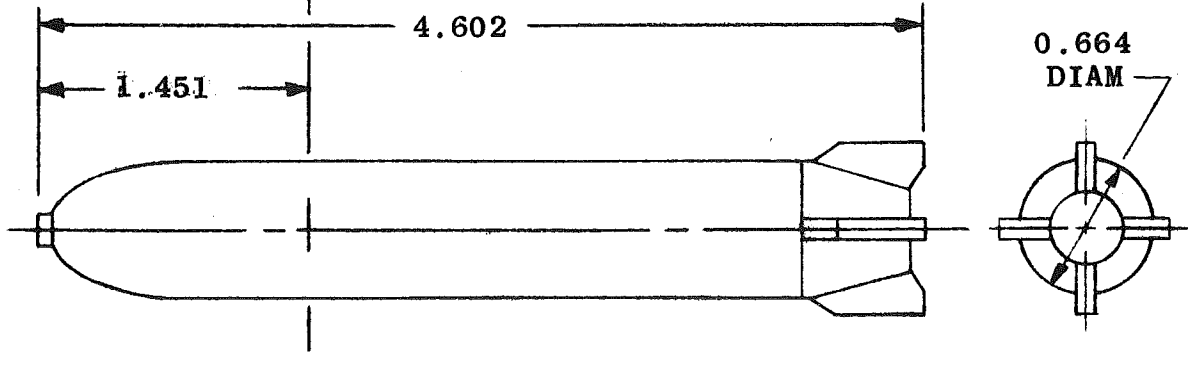
Figure 4 Continued



BLU-1 (UNGUIDED)



LAU-68

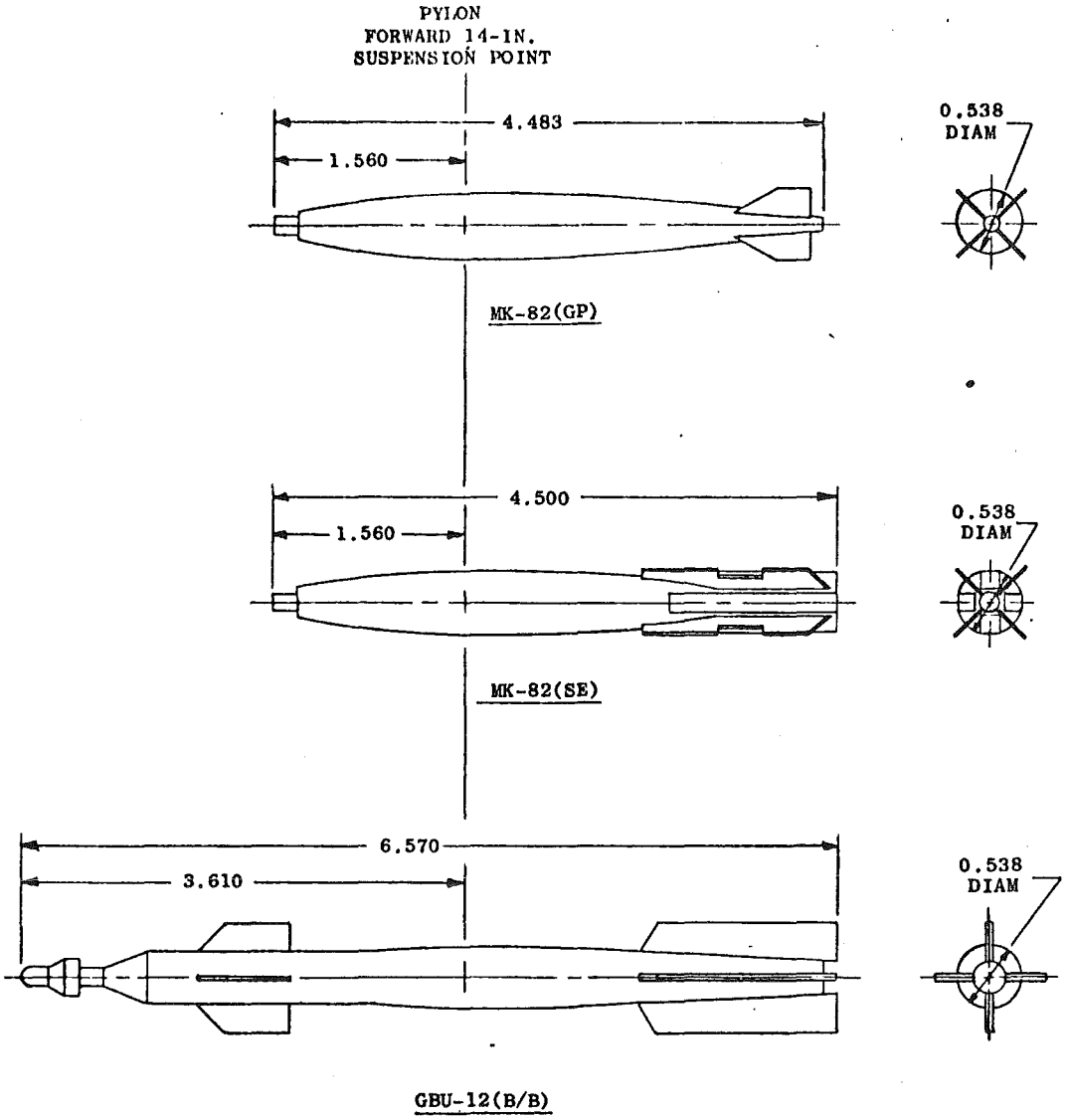


MK-20 (ROCKEYE)

NOTES: 1. DIMENSIONS IN INCHES
2. MK-20 SHOWN ROLLED 45 deg

d. BLU-1, LAU-68 and MK-20

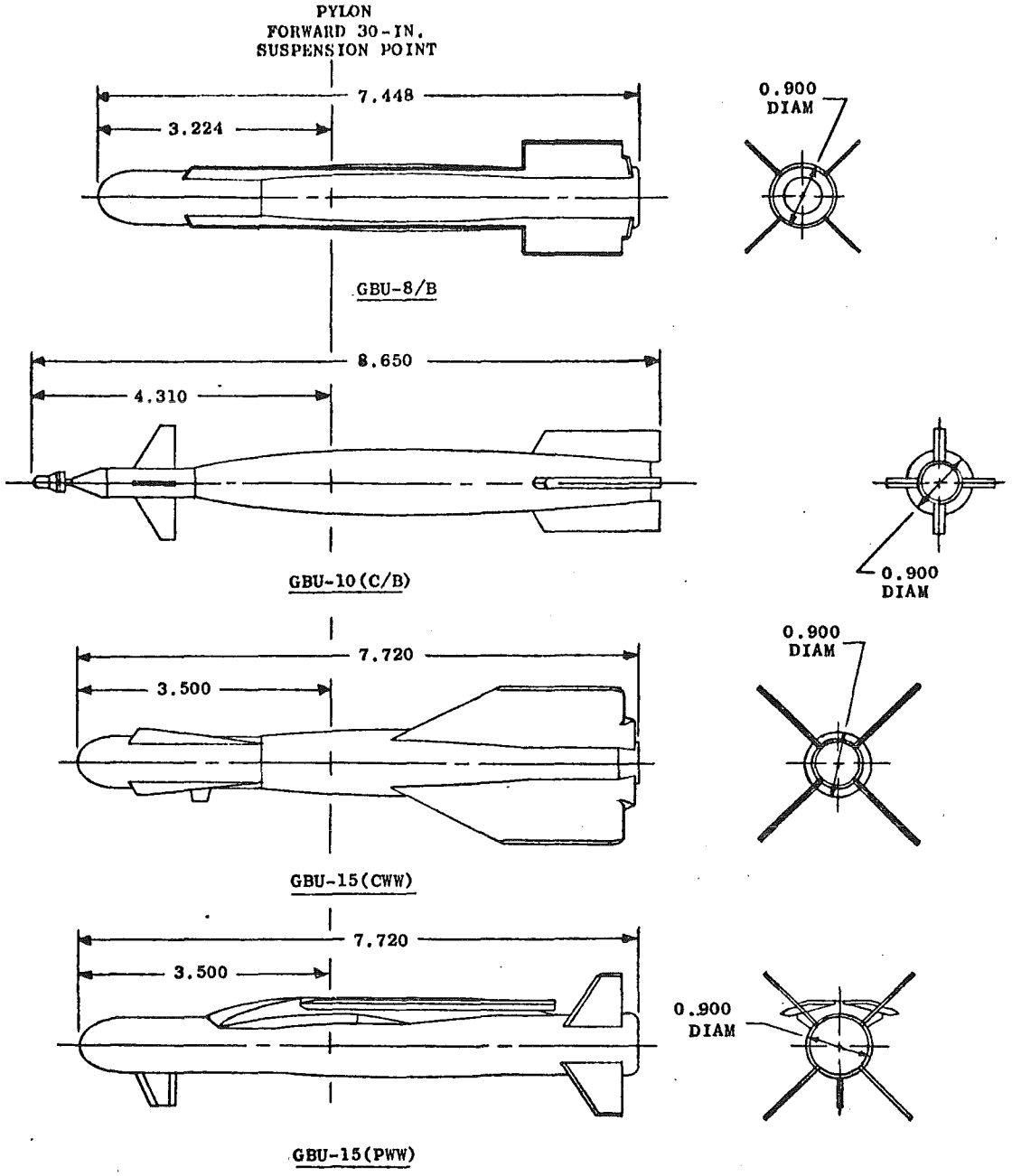
Figure 4 Continued



NOTES: 1. DIMENSIONS IN INCHES
2. GBU-12(B/B) SHOWN ROLLED 45 deg

e. MK-82 Series

Figure 4 Continued



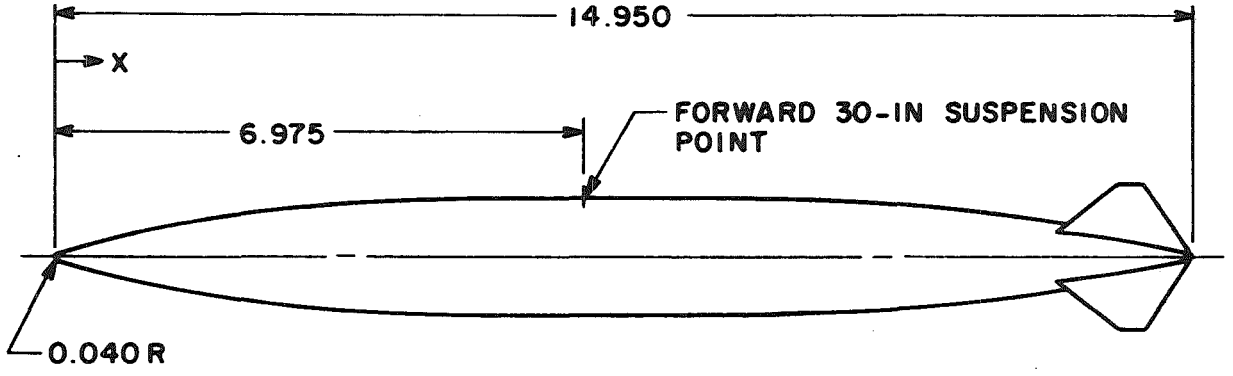
NOTES: 1. DIMENSIONS IN INCHES
2. GBU-10(C/B) SHOWN ROLLED 45 deg

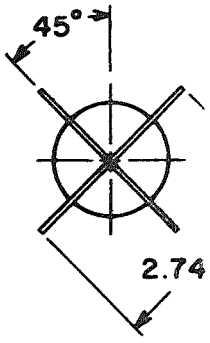
f. MK-84 Series

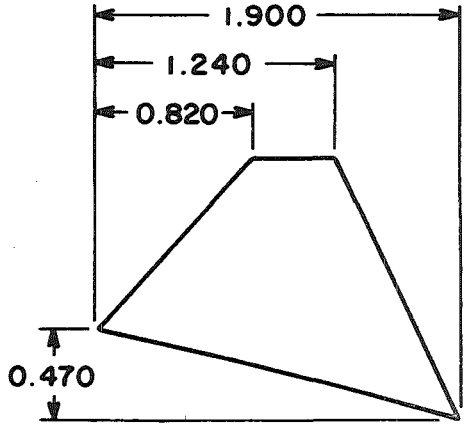
Figure 4 Continued

X	DIAM.
0	0
1	0.583
2	0.986
3	1.276
4	1.460
5	1.536
6	1.536
7	1.536
8	1.536
9	1.532
10	1.527
11	1.460
12	1.267
13	0.969
14	0.558

DIMENSIONS IN INCHES



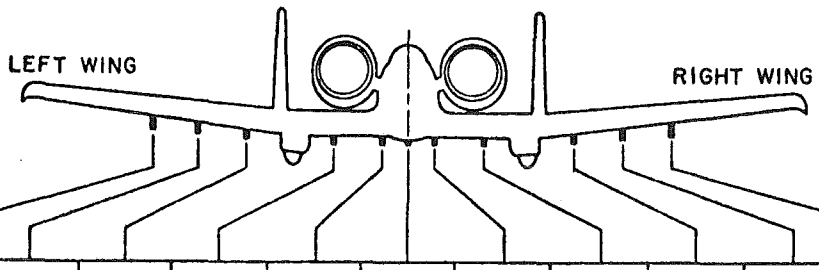




FIN DETAILS

g. 600-gal Tank

Figure 4 Concluded



CONFIG NO.	PYLON 1	PYLON 2	PYLON 3	PYLON 4	PYLON 5	PYLON 6	PYLON 7	PYLON 8	PYLON 9	PYLON 10	PYLON 11
1				600-Gal Tank		600-Gal Tank		600-Gal Tank			
2	AIQ-119			SUU-30		SUU-30		SUU-30			
3	AIQ-131			SUU-30	SUU-30		SUU-30	SUU-30			
4				BLU-1		SUU-30		BLU-1		SUU-30	
5	MK-82G			SUU-30	SUU-30				SUU-30	SUU-30	
6	MK-82G	MK-82G			SUU-30					SUU-30	SUU-30
7		MK-82G	MK-82G		SUU-30		SUU-30			SUU-30	
8			GBU-15C	MK-82G					SUU-30	SUU-30	
9			GBU-15C					MK-20		SUU-30	
10		MK-82G	GBU-15C				MK-20	MK-20			
11			SUU-30	MK-20				MK-20			
12		MK-82G	SUU-30					MK-20	SUU-30		

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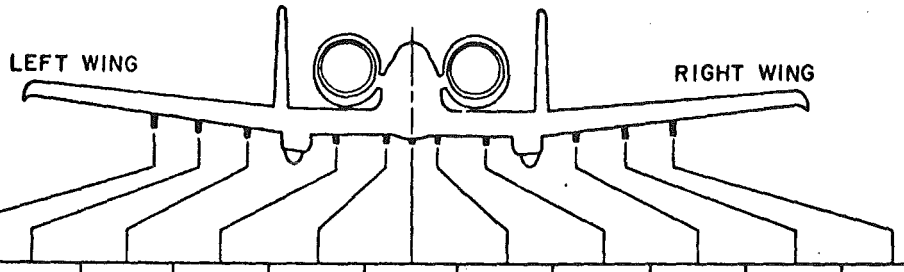
NOTE: DARK SYMBOLS INDICATE METRIC PYLONS

a. Configurations 1 through 12

Figure 5 Configuration Key



CONFIG NO.	PYLON 1	PYLON 2	PYLON 3	PYLON 4	PYLON 5	PYLON 6	PYLON 7	PYLON 8	PYLON 9	PYLON 10	PYLON 11
13			SUU-30					MK-20	SUU-30		
14			SUU-30	MK-20				MK-20			
15	MK-82G		SUU-30					MK-20		SUU-30	
16			MK-82G				MK-82S	MK-20			
17	GBU-12	LAU-68			MK-82S		MK-82S				
18	GBU-12			MK-82S	MK-82S				GBU-15C	BLU-1	
19	SUU-30	MK-82G			MK-82S					BLU-1	
20	SUU-30			MK-82S	MK-82G					MK-82G	
21	SUU-30	SUU-30			MK-82G		MK-82S			MK-82G	MK-82G
22	MK-82G	SUU-30			MK-82G				MK-82G	MK-82G	MK-82G
23	MK-20			GBU-10	GBU-10				MK-82G	MK-82G	
24	MK-20	MK-20			GBU-10				AGM-65	MK-82G	

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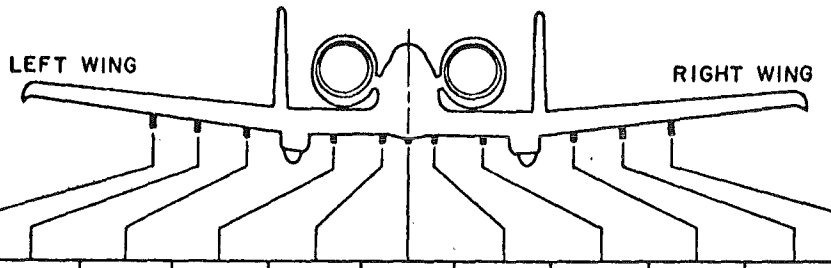
NOTE: DARK SYMBOLS INDICATE METRIC PYLONS

b. Configurations 13 through 24

Figure 5 Continued



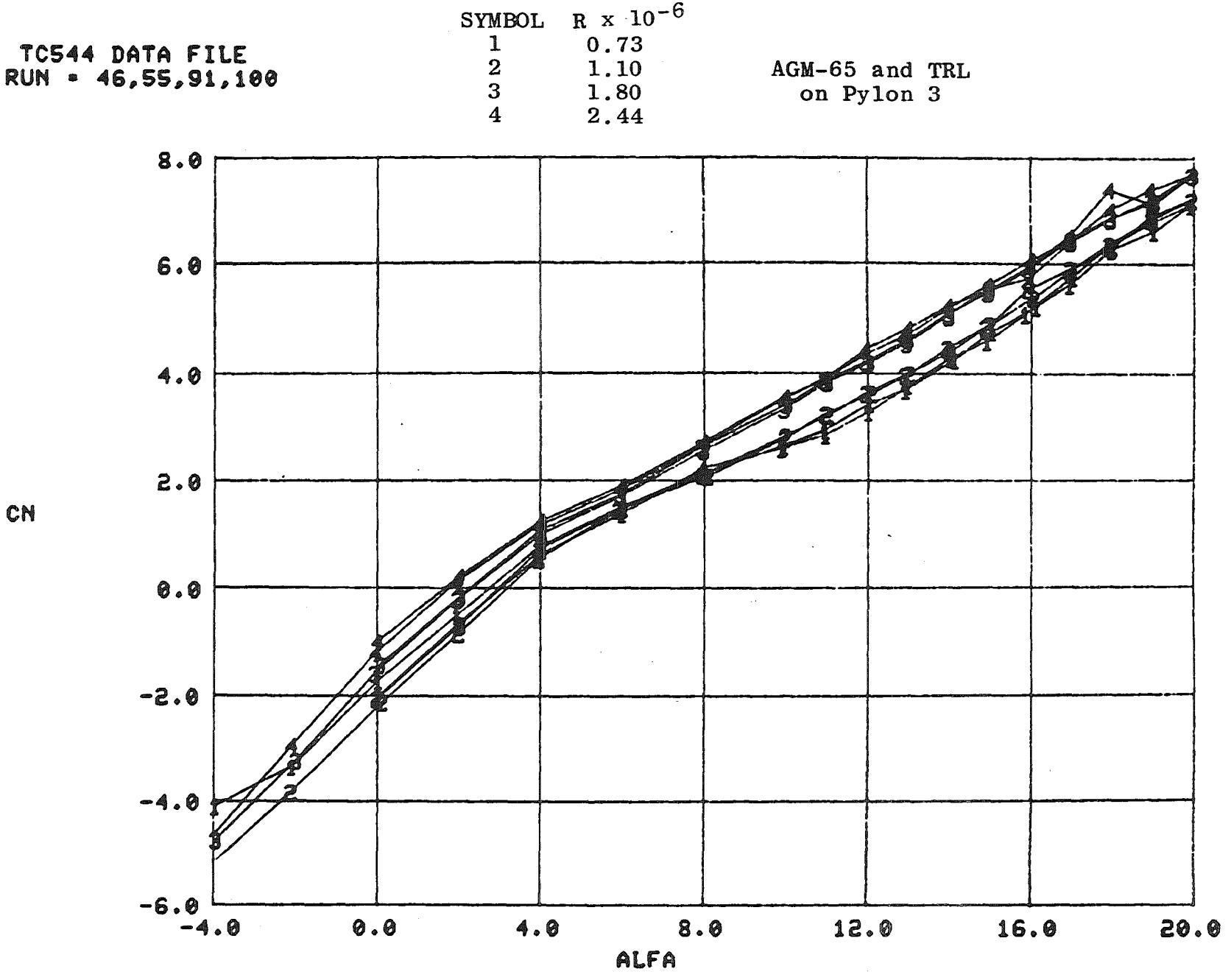
CONFIG NO.	PYLON 1	PYLON 2	PYLON 3	PYLON 4	PYLON 5	PYLON 6	PYLON 7	PYLON 8	PYLON 9	PYLON 10	PYLON 11
25	MK-20	SUU-30			GBU-10		GBU-10		SUU-30	MK-82G	
26			GBU-10	GBU-10	GBU-10		GBU-10	GBU-10			
27			GBU-10					GBU-10			
28	MK-82G		GBU-10					GBU-10	GBU-10		
29			AGM-65	GBU-10				GBU-10	AGM-65		
30	MK-82G	MK-82G	AGM-65	MK-82G	MK-82G		MK-82G	MK-82G	AGM-65	MK-82G	MK-82G
31	SUU-30	SUU-30	AGM-65	SUU-30	SUU-30		SUU-30	SUU-30	AGM-65	SUU-30	SUU-30
32			AGM-65				SUU-30	LAU-68	SUU-30	SUU-30	SUU-30
33			GBU-15P					GBU-8			
34		SUU-30	GBU-15P					GBU-8	GBU-8		
35	MK-82G		MK-82G					GBU-12			
36	GBU-12		MK-82G				GBU-12	GBU-12			

TER TRL

NOTE: DARK SYMBOLS INDICATE METRIC PYLONS

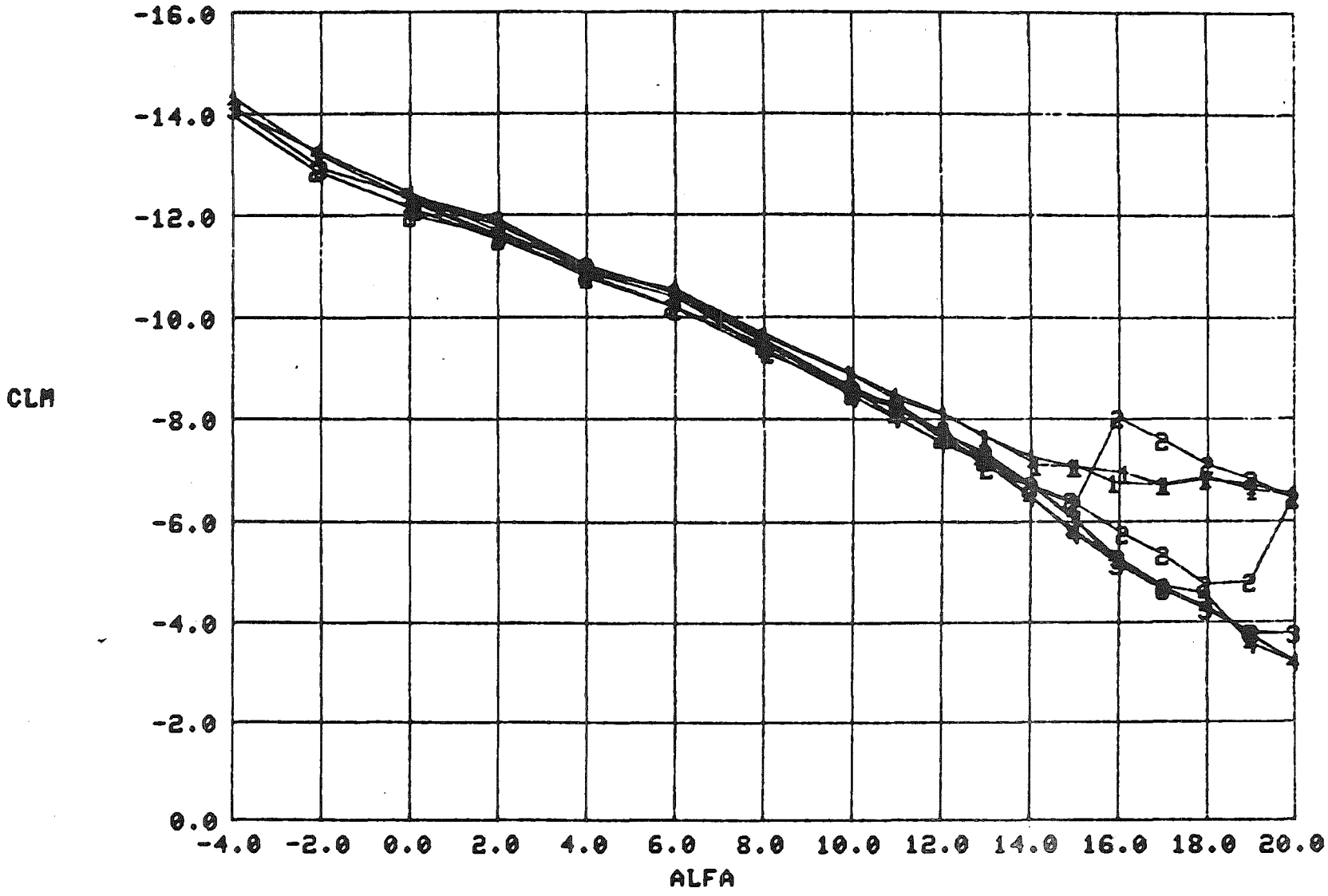
c. Configurations 25 through 36

Figure 5 Concluded



a. CN versus ALFA, MACH = 0.3, BETA = 0

Figure 6 Sample Online Data Plots, Configuration 30



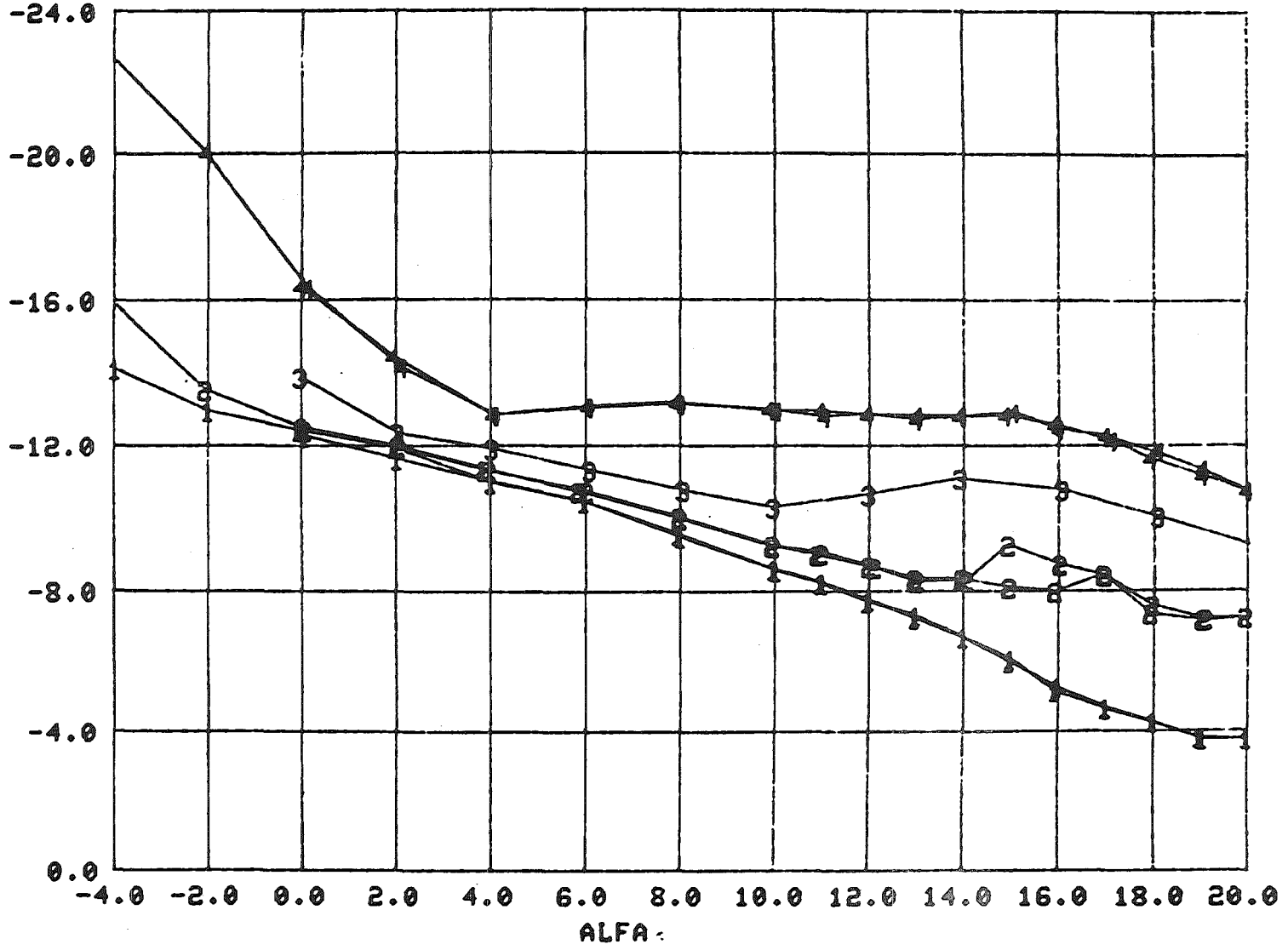
b. CLM versus ALFA, MACH = 0.3, BETA = 0

Figure 6 Continued

TC544 DATA FILE
RUN = 91,64,79,85

SYMBOL	MACH
1	0.30
2	0.50
3	0.65
4	0.75

AGM-65 and TRL
on Pylon 3



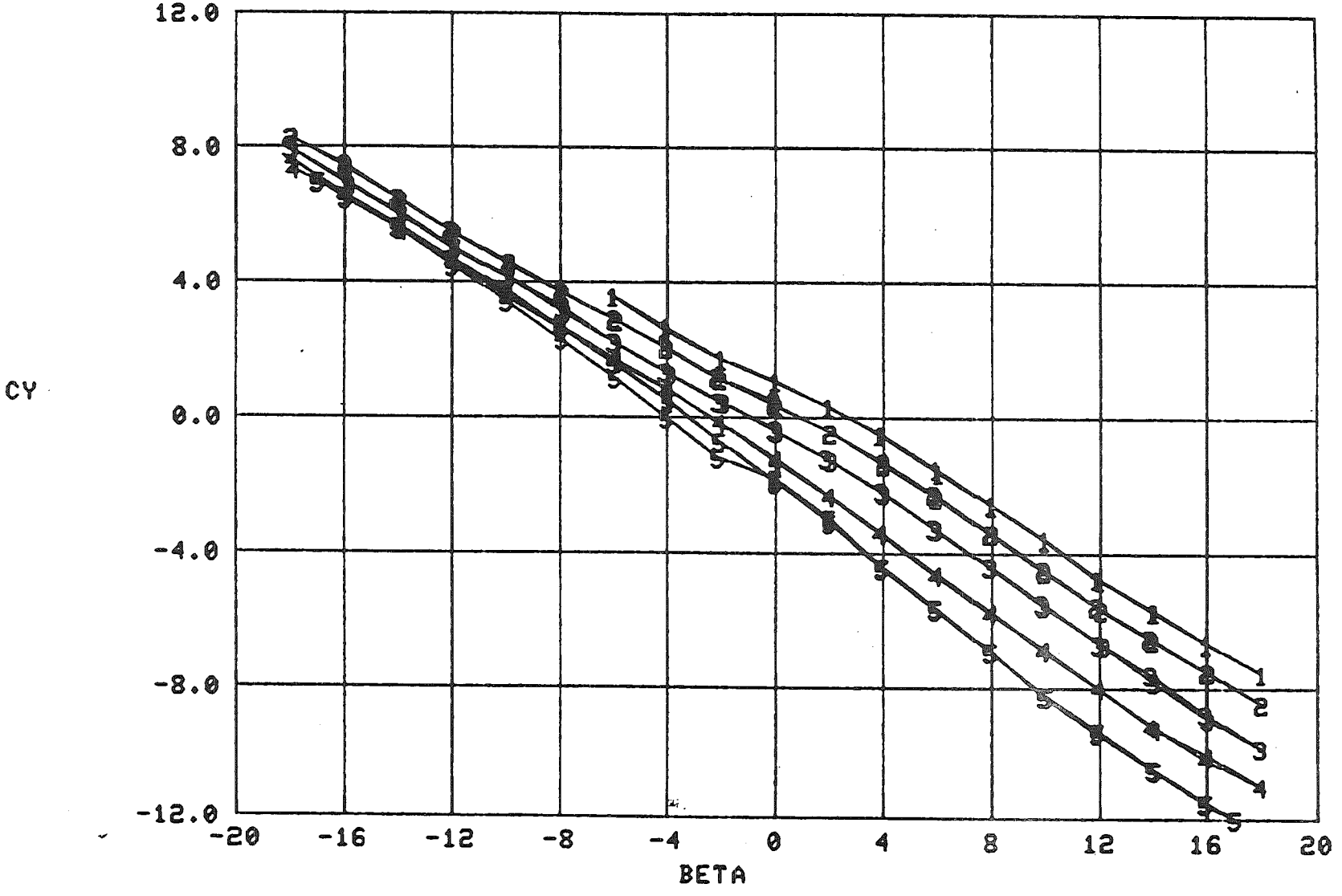
c. CLM versus ALFA, BETA = 0

Figure 6 Continued

TC544 DATA FILE
RUN = 56,60,61,62,63

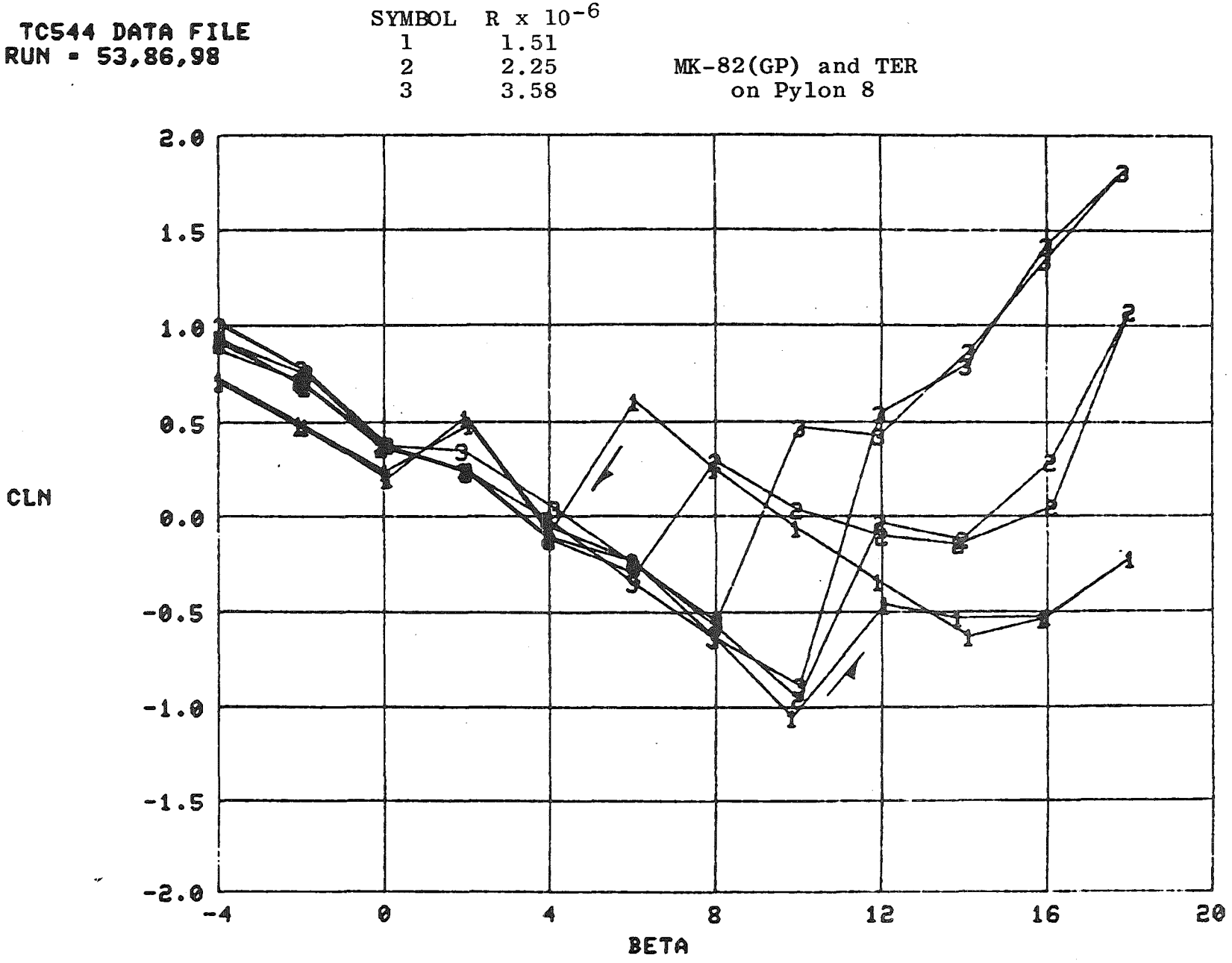
SYMBOL	ALFA
1	0
2	5
3	10
4	15
5	20

AGM-65 and TRL
on Pylon 3



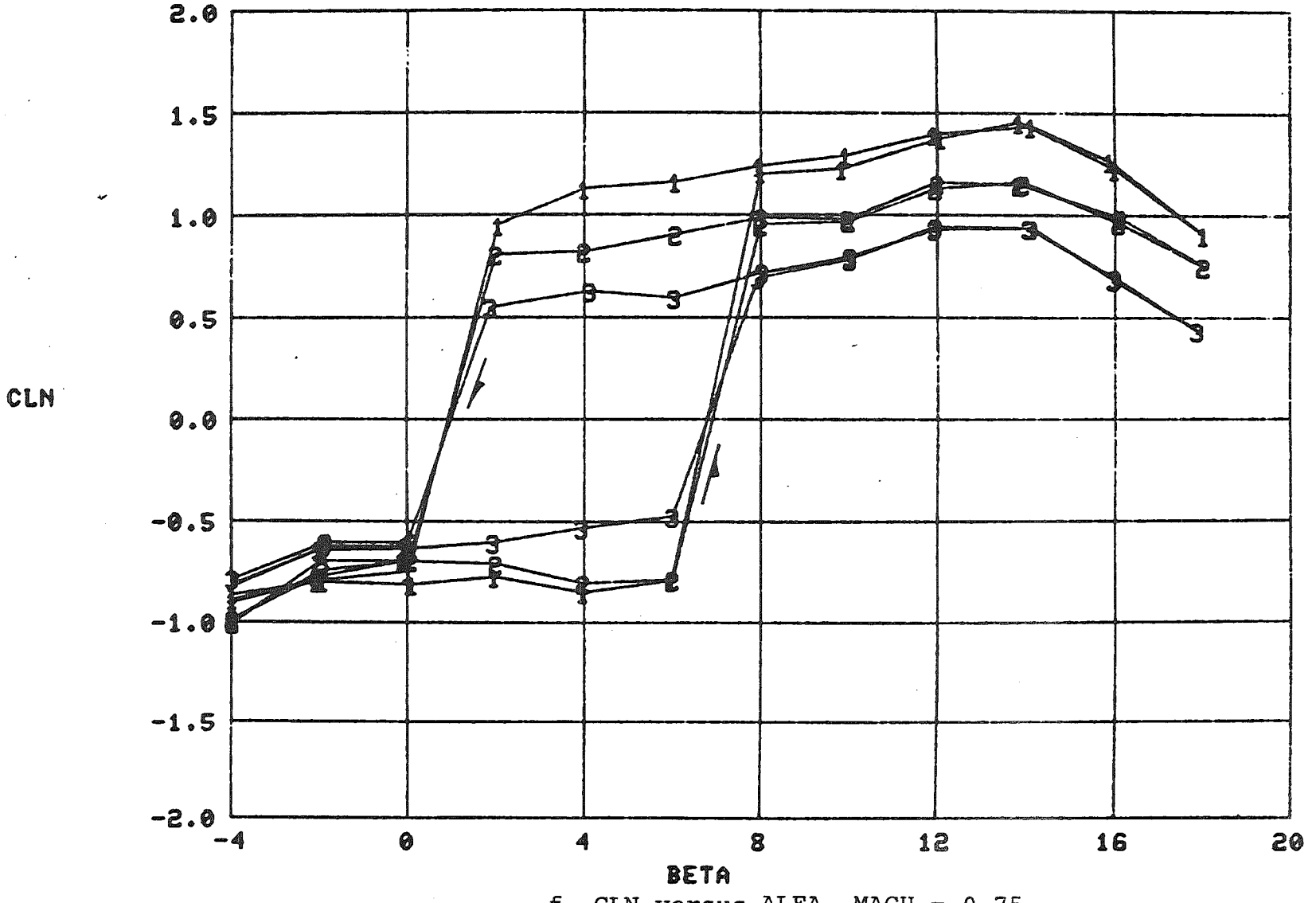
d. CY versus ALFA, MACH = 0.3

Figure 6 Continued



e. CLN versus ALFA , MACH = 0.75

Figure 6 Continued



f. CLN versus ALFA, MACH = 0.75

Figure 6 Concluded

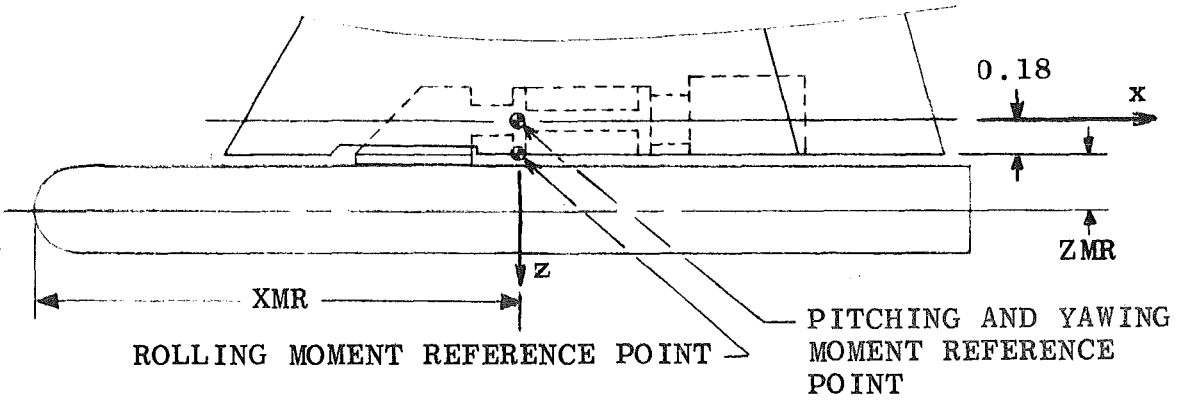
TABLE 1

SUMMARY OF NOMINAL TEST CONDITIONS

MACH	PT	Q	P	TT	R x 10^{-6}
0.30	800	47	752	82	0.73
0.30	1200	71	1127	81	1.10
0.30	2000*	118	1879	89	1.80
0.30	2800	166	2631	105	2.44
0.50	800	118	674	81	1.14
0.50	1200*	177	1012	83	1.70
0.50	2000	295	1686	96	2.75
0.65	1200*	267	903	83	2.06
0.75	800	217	551	81	1.51
0.75	1200*	325	826	84	2.25
0.75	2000	542	1377	102	3.58

* Primary Test Conditions

REFERENCE DIMENSIONS AND MOMENT REFERENCE POINTS



STORE	PYLON	RACK	XMR	ZMR	S	d
AGM-65	3	TRL	2.725	0.3500	0.00196	0.0500
ALQ-119-12	1	-	4.800	0.3000	0.00196	0.0500
ALQ-131(AB)	1	-	5.590	0.3850	0.00196	0.0500
BLU-1(U)	8,10	-	3.225	0.5187	0.00479	0.0781
GBU-8/B	8	-	3.974	0.5000	0.00442	0.0750
GBU-10(C/B)	3,5,8	-	5.060	0.5000	0.00442	0.0750
GBU-12(B/B)	1,8	-	3.960	0.3188	0.00158	0.0448
GBU-15(CWW)	3	-	4.251	0.5000	0.00442	0.0750
GBU-15(PWW)	3	-	4.251	0.5000	0.00442	0.0750
LAU-68	8	TER	1.610	1.0225	0.00134	0.0413
MK-20	1	-	2.201	0.3819	0.00240	0.0553
MK-20	8	MSER	4.552	0.8519	0.00240	0.0553
MK-20	8	TER	2.201	1.1060	0.00240	0.0553
MK-82(GP)	1,3,5,10	-	1.910	0.3188	0.00158	0.0448
MK-82(GP)	5	MSER	4.261	0.7888	0.00158	0.0448
MK-82(GP)	8	TER	1.910	1.0438	0.00158	0.0448
MK-82(SE)	5	TER	1.910	1.0438	0.00158	0.0448
600 GAL.	6,8	-	7.725	0.7980	0.01287	0.1280
SUU-30(H/B)	1,5,10	-	2.050	0.4530	0.00354	0.0672
SUU-30(H/B)	3,8	TER	2.050	1.1780	0.00354	0.0672
SUU-30(H/B)	5,6,8	MSER	4.401	0.9230	0.00354	0.0672
SUU-30(H/B)	6	MER	4.468	1.1780	0.00354	0.0672

Notes:
1. XMR Measured from Nose of Forward Store when Mounted on Rack.
2. ZMR Measured from Centerline of Lowest Store when Mounted on Rack.

TABLE 3

MEASUREMENT UNCERTAINTIES

DATA PARAMETER	MACH			
	0.30	0.50	0.65	0.75
	DATA UNCERTAINTIES			
MACH	±0.0077	±0.0066	±0.0054	±0.0049
PT	±4.3	±3.6	±3.6	±3.6
P	±4.3	±3.3	±3.1	±2.9
Q	±5.8	±4.3	±3.8	±3.5
CN(CN = 0)	±0.092	±0.061	±0.041	±0.033
CN(CN = 1)	±0.104	±0.066	±0.043	±0.035
CY(CY = 0)	±0.085	±0.057	±0.037	±0.031
CY(CY = 1)	±0.098	±0.061	±0.040	±0.033
CLM(CLM = 0)	±0.041	±0.027	±0.018	±0.015
CLM(CLM = 1)	±0.064	±0.037	±0.023	±0.018
CLN(CLN = 0)	±0.036	±0.024	±0.016	±0.013
CLN(CLN = 1)	±0.061	±0.034	±0.021	±0.017
CLL(CLL = 0)	±0.054	±0.036	±0.024	±0.020
CLL(CLL = 1)	±0.073	±0.043	±0.028	±0.022

Note: Uncertainties Calculated at the Primary Test Conditions Listed in Table 1.

SUMMARY OF TEST PROGRAM

AFATL A-10 CARRIAGE LOADS TEST

P41C-22 TC544

CONF.	ALFA	BETA	MACH, PT			
			0.30	0.50	0.65	0.75
			2000	1200	1200	1200
1	VARIABLE	0	1092	1098	1104	1111
↓	0	VARIABLE	1093	1099	1105	1114
↓	5	↓	1094	1100	1106	1115
↓	10	↓	1095	1101	1107	1116
↓	15	↓	1096	1102	1108	1117
↓	20	↓	1097	1103	1110	1118
2	VARIABLE	0	106	112	118	124
↓	0	VARIABLE	107	113	119	125
↓	5	↓	108	114	120	126
↓	10	↓	109	115	121	127
↓	15	↓	110	116	122	128
↓	20	↓	111	117	123	129
3	VARIABLE	0	133	139	145	151
↓	0	VARIABLE	134	140	146	152
↓	5	↓	135	141	147	153
↓	10	↓	136	142	148	154
↓	15	↓	137	143	149	155
↓	20	↓	138	144	150	156
4	VARIABLE	0	160	166	172	178
↓	0	VARIABLE	161	167	173	179
↓	5	↓	162	168	174	180
↓	10	↓	163	169	175	181
↓	15	↓	164	170	176	182
↓	20	↓	165	171	177	183
5	VARIABLE	0	187	193	199	205
↓	0	VARIABLE	188	194	200	206
↓	5	↓	189	195	201	207
↓	10	↓	190	196	202	208
↓	15	↓	191	197	203	209
↓	20	↓	192	198	204	210

TABLE 4 Continued

AFATL A-10 CARRIAGE LOADS TEST

P41C-22 TC544

CONF.	ALFA	BETA	MACH, PT			
			0.30	0.50	0.65	0.75
			2000	1200	1200	1200
6	VARIABLE	0	219	225	231	237
↓	0	VARIABLE	220	226	232	238
↓	5	↓	221	227	233	239
↓	10	↓	222	228	234	240
↓	15	↓	223	229	235	241
↓	20	↓	224	230	236	242
7	VARIABLE	0	247	253	262	268
↓	0	VARIABLE	248	254	263	269
↓	5	↓	249	258	264	270
↓	10	↓	250	259	265	271
↓	15	↓	251	260	266	272
↓	20	↓	252	261	267	273
8	VARIABLE	0	279	287	293	302
↓	0	VARIABLE	308	291	294	303
↓	5	↓	280	288	295	304
↓	10	↓	282	289	296	305
↓	15	↓	283	290	300	306
↓	20	↓	285	292	301	307
9	VARIABLE	0	316	322	328	334
↓	0	VARIABLE	317	323	329	335
↓	5	↓	318	324	330	336
↓	10	↓	319	325	331	337
↓	15	↓	320	326	332	338
↓	20	↓	321	327	333	339
10	VARIABLE	0	344	350	356	362
↓	0	VARIABLE	345	351	357	363
↓	5	↓	346	352	358	364
↓	10	↓	347	353	359	365
↓	15	↓	348	354	360	366
↓	20	↓	349	355	361	367

TABLE 4 Continued

AFATL A-10 CARRIAGE LOADS TEST

P41C-22 TC544

CONF.	ALFA	BETA	MACH, PT			
			0.30	0.50	0.65	0.75
			2000	1200	1200	1200
11	VARIABLE	0	372	378	384	390
↓	0	VARIABLE	373	379	385	391
↓	5	↓	374	380	386	392
↓	10	↓	375	381	387	393
↓	15	↓	376	382	388	394
↓	20	↓	377	383	389	395
12	VARIABLE	0	401	407	413	419
↓	0	VARIABLE	402	408	414	420
↓	5	↓	403	409	415	421
↓	10	↓	404	410	416	422
↓	15	↓	405	411	417	423
↓	20	↓	406	412	418	424
13	VARIABLE	0	429	442	448	454
↓	0	VARIABLE	430	443	449	455
↓	5	↓	431	444	450	456
↓	10	↓	432	445	451	457
↓	15	↓	440	446	452	458
↓	20	↓	441	447	453	459
14	VARIABLE	0	464	470	476	482
↓	0	VARIABLE	465	471	477	485
↓	5	↓	466	472	478	486
↓	10	↓	467	473	479	487
↓	15	↓	468	474	480	490
↓	20	↓	469	475	481	491
15	VARIABLE	0	495	501	507	513
↓	0	VARIABLE	496	502	508	514
↓	5	↓	497	503	509	515
↓	10	↓	498	504	510	516
↓	15	↓	499	505	511	517
↓	20	↓	500	506	512	518

TABLE 4 Continued

AFATL A-10 CARRIAGE LOADS TEST

P41C-22 TC544

CONF.	ALFA	BETA	MACH, PT			
			0.30	0.50	0.65	0.75
			2000	1200	1200	1200
16	VARIABLE	0	523	529	535	541
↓	0	VARIABLE	524	530	536	542
↓	5	↓	525	531	537	543
↓	10	↓	526	532	538	544
↓	15	↓	527	533	539	545
↓	20	↓	528	534	540	546
17	VARIABLE	0	551	557	563	569
↓	0	VARIABLE	552	558	564	570
↓	5	↓	553	559	565	571
↓	10	↓	554	560	566	572
↓	15	↓	555	561	567	573
↓	20	↓	556	562	568	574
18	VARIABLE	0	579	585	591	597
↓	0	VARIABLE	580	586	592	598
↓	5	↓	581	587	593	599
↓	10	↓	582	588	594	600
↓	15	↓	583	589	595	601
↓	20	↓	584	590	596	602
19	VARIABLE	0	607	613	619	625
↓	0	VARIABLE	608	614	620	626
↓	5	↓	609	615	621	627
↓	10	↓	610	616	622	628
↓	15	↓	611	617	623	629
↓	20	↓	612	618	624	630
20	VARIABLE	0	635	641	647	653
↓	0	VARIABLE	636	642	648	654
↓	5	↓	637	643	649	655
↓	10	↓	638	644	650	656
↓	15	↓	639	645	651	657
↓	20	↓	640	646	652	658

TABLE 4 Continued

AFATL A-10 CARRIAGE LOADS TEST

P41C-22 TC544

CONF.	ALFA	BETA	MACH, PT			
			0.30	0.50	0.65	0.75
			2000	1200	1200	1200
21	VARIABLE	0	661	667	683	688
↓	0	VARIABLE	662	668	682	689
↓	5	↓	663	669	684	690
↓	10	↓	664	670	685	691
↓	15	↓	665	671	686	692
↓	20	↓	666	672	687	693
22	VARIABLE	0	699	705	711	717
↓	0	VARIABLE	700	706	712	723
↓	5	↓	701	707	713	719
↓	10	↓	702	708	714	720
↓	15	↓	703	709	715	721
↓	20	↓	704	710	716	722
23	VARIABLE	0	728	734	740	746
↓	0	VARIABLE	729	735	741	747
↓	5	↓	730	736	742	748
↓	10	↓	731	737	743	749
↓	15	↓	732	738	744	750
↓	20	↓	733	739	745	751
24	VARIABLE	0	755	761	767	773
↓	0	VARIABLE	756	762	768	774
↓	5	↓	757	763	769	775
↓	10	↓	758	764	770	776
↓	15	↓	759	765	771	777
↓	20	↓	760	766	772	778
25	VARIABLE	0	782	790	796	802
↓	0	VARIABLE	783	791	797	803
↓	5	↓	784	792	798	804
↓	10	↓	787	793	799	805
↓	15	↓	788	794	800	806
↓	20	↓	789	795	801	807

TABLE 4 Continued

AFATL A-10 CARRIAGE LOADS TEST

P41C-22 TC544

CONF.	ALFA	BETA	MACH, PT			
			0.30	0.50	0.65	0.75
			2000	1200	1200	1200
26	VARIABLE	0	1064	1070	1076	1082
↓	0	VARIABLE	1065	1071	1077	1083
↓	5	↓	1066	1072	1078	1084
↓	10	↓	1067	1073	1079	1085
↓	15	↓	1068	1074	1080	1086
↓	20	↓	1069	1075	1081	1087
27	VARIABLE	0	811	817	823	829
↓	0	VARIABLE	812	818	824	830
↓	5	↓	813	819	825	831
↓	10	↓	814	820	826	832
↓	15	↓	815	821	827	833
↓	20	↓	816	822	828	834
28	VARIABLE	0	841	847	853	859
↓	0	VARIABLE	842	848	854	860
↓	5	↓	843	849	855	861
↓	10	↓	844	850	856	862
↓	15	↓	845	851	857	863
↓	20	↓	846	852	858	864
29	VARIABLE	0	869	875	881	887
↓	0	VARIABLE	870	876	882	888
↓	5	↓	871	877	883	889
↓	10	↓	872	878	884	890
↓	15	↓	873	879	885	891
↓	20	↓	874	880	886	892
30	VARIABLE	0	55	64	79	85
↓	0	VARIABLE	91	65	80	86
↓	5	↓	92	77	81	87
↓	10	↓	61 *	74	82	88
↓	15	↓	93	75	83	89
↓	20	↓	63 *	78	84	90

* PT = 1200

TABLE 4 Continued

AFATL A-10 CARRIAGE LOADS TEST

P41C-22 TC544

CONF.	ALFA	BETA	MACH, PT			
			0.30	0.50	0.65	0.75
			2000	1200	1200	1200
31	VARIABLE	0	897	903	909	915
↓	0	VARIABLE	898	904	910	916
↓	5	↓	899	905	911	917
↓	10	↓	900	906	912	918
↓	15	↓	901	907	913	919
↓	20	↓	902	908	914	920
32	VARIABLE	0	925	931	937	943
↓	0	VARIABLE	926	932	938	944
↓	5	↓	927	933	939	945
↓	10	↓	928	934	940	946
↓	15	↓	929	935	941	947
↓	20	↓	930	936	942	948
33	VARIABLE	0	956	962	968	974
↓	0	VARIABLE	957	963	969	975
↓	5	↓	958	964	970	976
↓	10	↓	959	965	971	977
↓	15	↓	960	966	972	978
↓	20	↓	961	967	973	979
34	VARIABLE	0	984	990	996	1002
↓	0	VARIABLE	985	991	997	1003
↓	5	↓	986	992	998	1004
↓	10	↓	987	993	999	1005
↓	15	↓	988	994	1000	1006
↓	20	↓	989	995	1001	1007
35	VARIABLE	0	1011	1017	1023	1029
↓	0	VARIABLE	1012	1018	1024	1030
↓	5	↓	1013	1019	1025	1031
↓	10	↓	1014	1020	1026	1032
↓	15	↓	1015	1021	1027	1033
↓	20	↓	1016	1022	1028	1034

TABLE 4 Concluded

AFATL A-10 CARRIAGE LOADS TEST

P41C-22 TC544

CONF.	ALFA	BETA	MACH, PT			
			0.30	0.50	0.65	0.75
			2000	1200	1200	1200
36	VARIABLE	0	1038	1044	1050	1056
↓	0	VARIABLE	1039	1045	1051	1057
↓	5	↓	1040	1046	1052	1058
↓	10	↓	1041	1047	1053	1059
↓	15	↓	1042	1048	1054	1060
↓	20	↓	1043	1049	1055	1061

REYNOLDS NUMBER AND HYSTERESIS CHECKS

CONFIGURATION 30

PT	ALFA	BETA	MACH			
			0.30	0.50	0.65	0.75
800	VARIABLE	0	46	49		52
↓	0	VARIABLE	47	50		53
↓	15	↓	48	51		73
1200	VARIABLE	0	55	64	79	85
↓	0	VARIABLE	56	65	80	86
↓	5	↓	60	77	81	87
↓	10	↓	61	74	82	88
↓	15	↓	62	75	83	89
↓	20	↓	63	78	84	90
2000	VARIABLE	0	91	94		97
↓	0	VARIABLE	92	95		98
↓	15	↓	93	96		99
2800	VARIABLE	0	100			
↓	0	VARIABLE	101			
↓	15	↓	102			

TABLE 5

SAMPLE TABULATED DATA FORMATS

DATE 30-MAY-78 PROJECT NO P41C-22
ARO, INC.
AEDC DIVISION
A SVERDRUP CORPORATION COMPANY
PROPULSION WIND TUNNEL
ARNOLD AIR FORCE STATION, TENNESSEE

TEST 544 PART 46 AFATL A-10 CARRIAGE LOADS TEST
SUMMARY 1
DATE 5/26/78 TRANSONIC 4T

MACH	PT	P	Q	TT	RX10-6	CONF
0.2989	802.8	754.6	47.2	83.6	0.7294	30.

PYLON	1	2	3	4	5	6	7	8	9	10	11
STORE	MK-82/GP	MK-82/GP	AGM-65	MK-82/GP	MK-82/GP	PYLON	MK-82/GP	MK-82/GP	AGM-65	MK-82/GP	MK-82/GP
RACK			TRL	TER				TER	TRL		

					PYLON 1						PYLON 3					
TP	ALFA	BETA	ALFI	PHII	CN	CY	CLM	CLN	CLL	XCP	CN	CY	CLM	CLN	CLL	XCP
3	-3.99	0.00	-4.54	0.0	0.944	0.907	-3.487	-0.997	-0.029	-3.693	-4.097	1.134	-14.307	1.622	-0.488	3.492
4	-2.09	-0.00	-2.56	0.1	0.949	0.875	-3.182	-1.014	-0.219	-3.353	-3.332	1.486	-13.234	1.151	-0.659	3.972
6	0.03	0.00	-0.61	0.0	0.975	0.716	-3.027	-0.992	0.246	-3.104	-1.692	1.188	-12.293	0.692	-0.520	7.264
7	1.96	0.00	1.29	0.0	0.786	0.527	-2.726	-0.838	0.184	-3.466	-0.485	0.954	-11.796	0.450	-0.237	24.296
8	3.94	0.00	3.27	0.0	0.657	0.476	-2.530	-0.760	0.338	-3.851	0.771	0.704	-11.029	0.453	-0.200	-14.308
9	6.03	0.00	5.29	0.0	0.658	0.307	-2.229	-0.568	0.458	-3.389	1.538	0.459	-10.459	0.352	-0.037	-6.801
10	7.98	0.00	7.20	0.0	0.464	0.128	-1.917	-0.360	0.569	-4.132	2.130	0.233	-9.636	0.145	-0.011	-4.523
11	9.98	0.00	9.18	0.0	0.494	0.057	-1.627	-0.176	0.710	-3.296	2.665	0.010	-8.867	-0.058	-0.067	-3.327
12	10.96	0.00	10.18	0.0	0.396	0.001	-1.476	-0.086	0.522	-3.729	2.957	-0.182	-8.389	-0.148	0.118	-2.837
15	12.06	0.00	11.20	0.0	0.351	-0.052	-1.407	-0.006	0.846	-4.009	3.446	-0.326	-8.078	-0.152	0.196	-2.344
16	12.95	0.00	12.12	0.0	0.478	-0.135	-1.292	0.125	0.826	-2.700	3.704	-0.421	-7.690	-0.181	0.294	-2.076
18	14.15	0.00	13.39	0.0	0.463	-0.253	-1.104	0.238	0.944	-2.384	4.267	-0.671	-7.117	-0.177	0.332	-1.668
19	15.08	0.00	14.24	0.0	0.372	-0.336	-0.965	0.366	1.094	-2.594	4.780	-0.872	-7.083	-0.159	0.520	-1.482
20	15.91	0.00	15.16	0.0	0.408	-0.392	-0.698	0.454	1.076	-1.712	5.109	-1.018	-6.767	-0.163	0.476	-1.325
21	17.07	0.00	16.25	0.0	0.443	-0.433	-0.765	0.448	0.896	-1.726	5.783	-1.324	-6.722	-0.204	0.504	-1.162
22	17.96	0.00	17.16	0.0	0.530	-0.491	-0.742	0.535	1.056	-1.400	6.341	-1.524	-6.838	-0.145	0.446	-1.078
23	19.03	0.00	18.20	0.0	0.735	-0.552	-0.750	0.562	1.022	-1.020	6.785	-1.644	-6.734	-0.109	0.647	-0.992
24	19.96	0.00	19.15	0.0	0.732	-0.594	-0.752	0.555	1.015	-1.027	7.101	-1.758	-6.508	-0.068	0.746	-0.917
25	19.04	0.00	18.21	0.0	0.517	-0.509	-0.729	0.566	1.200	-1.411	6.608	-1.612	-6.613	-0.139	0.650	-1.001
26	18.02	0.00	17.18	0.0	0.488	-0.465	-0.676	0.493	1.069	-1.384	6.263	-1.392	-6.843	-0.185	0.616	-1.093
27	16.99	0.00	16.17	0.0	0.443	-0.450	-0.762	0.547	0.894	-1.720	5.630	-1.178	-6.730	-0.310	0.547	-1.196
28	16.15	0.00	15.19	0.0	0.499	-0.354	-0.842	0.467	1.094	-1.689	5.229	-1.021	-6.944	-0.268	0.472	-1.328
30	14.94	0.00	14.14	0.0	0.513	-0.302	-1.025	0.383	1.122	-1.999	4.611	-0.831	-7.075	-0.185	0.546	-1.535
31	14.04	0.00	13.22	0.0	0.376	-0.242	-1.124	0.291	0.947	-2.992	4.296	-0.649	-7.273	-0.206	0.459	-1.693
32	13.01	0.00	12.17	0.0	0.479	-0.106	-1.288	0.077	0.998	-2.689	3.772	-0.491	-7.658	-0.128	0.396	-2.030
33	12.03	0.00	11.16	0.0	0.442	-0.013	-1.391	0.005	0.863	-3.144	3.295	-0.296	-8.123	-0.148	0.459	-2.465
34	10.98	0.00	10.11	0.0	0.401	0.041	-1.475	-0.081	0.870	-3.679	2.868	-0.141	-8.471	-0.102	0.256	-2.954
35	9.91	0.00	9.12	0.0	0.535	0.029	-1.689	-0.132	0.699	-3.159	2.621	0.010	-8.906	-0.060	0.181	-3.398
36	8.03	0.00	7.24	0.0	0.505	0.166	-1.809	-0.347	0.577	-3.579	2.253	0.210	-9.656	0.175	0.003	-4.286
37	5.99	0.00	5.23	0.0	0.657	0.306	-2.220	-0.568	0.627	-3.378	1.388	0.435	-10.554	0.379	0.211	-7.605
38	3.99	0.00	3.27	0.0	0.660	0.439	-2.539	-0.776	0.496	-3.846	0.634	0.737	-10.865	0.457	0.061	-17.131
39	2.00	0.00	1.32	0.0	0.810	0.581	-2.797	-0.851	0.375	-3.451	-0.639	0.988	-11.893	0.497	-0.109	18.615
40	-0.01	0.00	-0.65	0.0	0.893	0.758	-3.064	-0.985	0.261	-3.431	-2.011	1.233	-12.372	0.738	-0.256	6.152

TABLE 5 Continued

DATE 30-MAY-78 PROJECT NO P41C-22
ARO, INC.
AEDC DIVISION
A SVERDRUP CORPORATION COMPANY
PROPULSION WIND TUNNEL
ARNOLD AIR FORCE STATION, TENNESSEE

TEST 544 PART 46 AFATL A-10 CARRIAGE LOADS TEST
SUMMARY 2
DATE 5/26/78

TRANSONIC 4T

MACH	PT	P	Q	TT	RX10-6	CONF
0.2989	802.8	754.6	47.2	83.6	0.7294	30.

PYLON	1	2	3	4	5	6	7	8	9	10	11
STORE	MK-82/GP	MK-82/GP	AGM-65	MK-82/GP	MK-82/GP	PYLON	MK-82/GP	MK-82/GP	AGM-65	MK-82/GP	MK-82/GP
RACK			TRL	TER				TER	TRL		

					PYLON 5						PYLON 6					
TP	ALFA	BETA	ALFI	PHII	CN	CY	CLM	CLN	CLL	XCP	CN	CY	CLM	CLN	CLL	XCP
3	-3.99	0.00	-4.54	0.0	0.015	-0.937	0.324	0.536	-2.357	21.077	0.000	0.000	0.000	0.000	0.000	0.000
4	-2.09	-0.00	-2.56	0.1	0.160	-0.714	0.116	0.620	-2.631	0.724	0.000	0.000	0.000	0.000	0.000	0.000
6	0.03	0.00	-0.61	0.0	0.129	-0.490	-0.141	0.716	-2.484	-1.093	0.000	0.000	0.000	0.000	0.000	0.000
7	1.96	0.00	1.29	0.0	0.133	-0.410	-0.139	0.734	-2.444	-1.047	0.000	0.000	0.000	0.000	0.000	0.000
8	3.94	0.00	3.27	0.0	0.046	-0.337	-0.162	0.767	-2.597	-3.531	0.000	0.000	0.000	0.000	0.000	0.000
9	6.03	0.00	5.29	0.0	0.136	-0.293	-0.136	0.847	-2.625	-1.002	0.000	0.000	0.000	0.000	0.000	0.000
10	7.98	0.00	7.20	0.0	0.138	-0.250	-0.134	0.845	-2.418	-0.972	0.000	0.000	0.000	0.000	0.000	0.000
11	9.98	0.00	9.18	0.0	0.130	-0.199	-0.127	0.907	-2.540	-0.975	0.000	0.000	0.000	0.000	0.000	0.000
12	10.96	0.00	10.18	0.0	0.129	-0.161	-0.125	0.918	-2.526	-0.968	0.000	0.000	0.000	0.000	0.000	0.000
15	12.06	0.00	11.20	0.0	0.167	-0.189	-0.027	0.961	-2.536	-0.160	0.000	0.000	0.000	0.000	0.000	0.000
16	12.95	0.00	12.12	0.0	-0.014	-0.218	0.095	1.015	-2.570	-6.741	0.000	0.000	0.000	0.000	0.000	0.000
18	14.15	0.00	13.39	0.0	0.069	-0.205	0.122	1.054	-2.528	1.767	0.000	0.000	0.000	0.000	0.000	0.000
19	15.08	0.00	14.24	0.0	0.024	-0.242	0.028	1.044	-2.385	1.134	0.000	0.000	0.000	0.000	0.000	0.000
20	15.91	0.00	15.16	0.0	0.103	-0.245	0.054	1.052	-2.562	0.520	0.000	0.000	0.000	0.000	0.000	0.000
21	17.07	0.00	16.25	0.0	0.138	-0.286	0.151	1.044	-2.590	1.089	0.000	0.000	0.000	0.000	0.000	0.000
22	17.96	0.00	17.16	0.0	0.181	-0.260	0.079	1.007	-2.598	0.437	0.000	0.000	0.000	0.000	0.000	0.000
23	19.03	0.00	18.20	0.0	-0.004	-0.213	0.024	0.862	-2.730	-6.070	0.000	0.000	0.000	0.000	0.000	0.000
24	19.96	0.00	19.15	0.0	0.086	-0.201	-0.114	0.916	-2.566	-1.335	0.000	0.000	0.000	0.000	0.000	0.000
25	19.04	0.00	18.21	0.0	0.219	-0.201	0.004	0.904	-2.540	0.019	0.000	0.000	0.000	0.000	0.000	0.000
26	18.02	0.00	17.18	0.0	0.091	-0.206	0.050	0.929	-2.764	0.551	0.000	0.000	0.000	0.000	0.000	0.000
27	16.99	0.00	16.17	0.0	0.060	-0.135	0.117	0.883	-2.550	1.954	0.000	0.000	0.000	0.000	0.000	0.000
28	16.15	0.00	15.19	0.0	0.152	-0.163	-0.024	0.925	-2.550	-0.159	0.000	0.000	0.000	0.000	0.000	0.000
30	14.94	0.00	14.14	0.0	0.020	-0.199	0.033	1.137	-2.741	1.630	0.000	0.000	0.000	0.000	0.000	0.000
31	14.04	0.00	13.22	0.0	0.070	-0.194	0.124	1.105	-2.515	1.770	0.000	0.000	0.000	0.000	0.000	0.000
32	13.01	0.00	12.17	0.0	0.206	-0.207	0.075	1.060	-2.544	0.364	0.000	0.000	0.000	0.000	0.000	0.000
33	12.03	0.00	11.16	0.0	0.168	-0.190	-0.027	0.967	-2.552	-0.161	0.000	0.000	0.000	0.000	0.000	0.000
34	10.98	0.00	10.11	0.0	0.036	-0.161	0.016	0.918	-2.680	0.458	0.000	0.000	0.000	0.000	0.000	0.000
35	9.91	0.00	9.12	0.0	0.130	-0.199	-0.126	0.903	-2.530	-0.974	0.000	0.000	0.000	0.000	0.000	0.000
36	8.03	0.00	7.24	0.0	0.128	-0.252	-0.132	0.851	-2.742	-1.031	0.000	0.000	0.000	0.000	0.000	0.000
37	5.99	0.00	5.23	0.0	0.098	-0.277	-0.229	0.891	-2.427	-2.347	0.000	0.000	0.000	0.000	0.000	0.000
38	3.99	0.00	3.27	0.0	0.136	-0.299	-0.138	0.779	-2.590	-1.015	0.000	0.000	0.000	0.000	0.000	0.000
39	2.00	0.00	1.32	0.0	0.135	-0.306	-0.140	0.797	-2.804	-1.035	0.000	0.000	0.000	0.000	0.000	0.000
40	-0.01	-0.00	-0.65	0.0	0.088	-0.388	-0.072	0.702	-2.627	-0.821	0.000	0.000	0.000	0.000	0.000	0.000

TABLE 5 Concluded

DATE 30-MAY-78 PROJECT NO P41C-22
ARO, INC.
AEDC DIVISION
A SVERDRUP CORPORATION COMPANY
PROPULSION WIND TUNNEL
ARNOLD AIR FORCE STATION, TENNESSEE

TEST 544 PART 46 AFATL A-10 CARRIAGE LOADS TEST
SUMMARY 3
DATE 5/26/78 TRANSONIC 4T

MACH	PT	P	Q	TT	RX10-6	CONF
0.2989	802.8	754.6	47.2	83.6	0.7294	30.

PYLON STORE RACK	1	2	3	4	5	6	7	8	9	10	11
	MK-82/GP	MK-82/GP	AGM-65 TRL	MK-82/GP TER	MK-82/GP	PYLON	MK-82/GP	MK-82/GP TER	AGM-65 TRL	MK-82/GP	MK-82/GP

					PYLON 8						PYLON 10					
TP	ALFA	BETA	ALFI	PHII	CN	CY	CLM	CLN	CLL	XCP	CN	CY	CLM	CLN	CLL	XCP
3	-3.99	0.00	-4.54	0.0	0.507	-0.417	-5.041	0.997	-0.287	-9.949	0.793	-0.129	-1.342	1.029	0.536	-1.692
4	-2.09	-0.00	-2.56	0.1	0.746	-0.306	-5.117	0.893	-0.612	-6.864	0.802	-0.082	-1.360	1.109	0.399	-1.697
6	0.03	0.00	-0.61	0.0	0.701	-0.162	-4.618	0.804	-0.561	-6.588	0.830	-0.062	-1.398	0.986	0.388	-1.685
7	1.96	0.00	1.29	0.0	0.575	-0.084	-4.230	0.818	-0.534	-7.356	0.870	0.003	-1.464	0.952	0.247	-1.683
8	3.94	0.00	3.27	0.0	0.710	-0.003	-3.984	0.696	-0.692	-5.613	0.914	0.004	-1.540	0.955	0.412	-1.686
9	6.03	0.00	5.29	0.0	0.646	0.161	-3.786	0.447	-0.471	-5.861	0.878	0.055	-1.665	1.038	0.446	-1.897
10	7.98	0.00	7.20	0.0	0.637	0.257	-3.604	0.219	-0.618	-5.661	0.819	0.094	-1.745	1.040	0.459	-2.130
11	9.98	0.00	9.18	0.0	0.625	0.377	-3.422	-0.047	-0.754	-5.472	0.758	0.148	-1.654	0.941	0.632	-2.182
12	10.96	0.00	10.18	0.0	0.705	0.392	-3.406	-0.142	-0.750	-4.831	0.671	0.148	-1.680	0.944	0.470	-2.503
15	12.06	0.00	11.20	0.0	0.867	0.434	-3.356	-0.277	-1.096	-3.871	0.577	0.241	-1.703	0.869	0.500	-2.952
16	12.95	0.00	12.12	0.0	0.880	0.546	-3.414	-0.452	-0.893	-3.879	0.712	0.244	-1.766	0.877	0.504	-2.480
18	14.15	0.00	13.39	0.0	0.904	0.606	-3.449	-0.623	-0.859	-3.815	0.743	0.175	-1.808	0.896	0.476	-2.434
19	15.08	0.00	14.24	0.0	0.948	0.702	-3.537	-0.700	-1.014	-3.732	0.656	0.149	-1.842	0.945	0.474	-2.809
20	15.91	0.00	15.16	0.0	0.897	0.719	-3.482	-0.797	-1.012	-3.881	0.694	0.133	-1.915	1.044	0.476	-2.758
21	17.07	0.00	16.25	0.0	0.924	0.710	-3.558	-0.852	-1.201	-3.852	0.744	0.056	-1.992	1.029	0.283	-2.678
22	17.96	0.00	17.16	0.0	1.145	0.790	-3.770	-0.836	-1.001	-3.291	0.780	0.078	-1.907	1.142	0.466	-2.445
23	19.03	0.00	18.20	0.0	1.512	0.865	-5.032	-1.238	-1.322	-3.328	0.673	0.045	-2.075	1.325	0.468	-3.084
24	19.96	0.00	19.15	0.0	1.510	0.893	-5.055	-1.140	-1.141	-3.349	0.718	0.062	-1.991	1.235	0.468	-2.771
25	19.04	0.00	18.21	0.0	1.507	0.882	-4.998	-1.126	-1.126	-3.317	0.625	0.045	-1.993	1.317	0.465	-3.187
26	18.02	0.00	17.18	0.0	1.453	0.768	-5.123	-1.085	-1.193	-3.525	0.736	0.062	-2.011	1.246	0.471	-2.734
27	16.99	0.00	16.17	0.0	1.333	0.840	-5.037	-1.055	-1.156	-3.777	0.695	0.061	-1.928	1.239	0.302	-2.779
28	16.15	0.00	15.19	0.0	1.385	0.823	-4.926	-0.958	-1.158	-3.558	0.735	0.100	-1.994	1.244	0.482	-2.712
30	14.94	0.00	14.14	0.0	0.912	0.635	-3.520	-0.732	-1.055	-3.860	0.711	0.162	-1.942	1.016	0.323	-2.731
31	14.04	0.00	13.22	0.0	0.777	0.632	-3.401	-0.665	-0.848	-4.376	0.652	0.213	-1.829	0.905	0.491	-2.804
32	13.01	0.00	12.17	0.0	0.871	0.503	-3.395	-0.459	-0.719	-3.896	0.656	0.254	-1.844	0.921	0.675	-2.811
33	12.03	0.00	11.16	0.0	0.791	0.436	-3.415	-0.281	-0.743	-4.320	0.575	0.227	-1.712	0.969	0.670	-2.979
34	10.98	0.00	10.11	0.0	0.701	0.389	-3.385	-0.141	-0.745	-4.832	0.621	0.213	-1.763	0.906	0.491	-2.841
35	9.91	0.00	9.12	0.0	0.799	0.374	-3.531	-0.047	-0.572	-4.421	0.632	0.184	-1.771	0.956	0.159	-2.802
36	8.03	0.00	7.24	0.0	0.808	0.242	-3.711	0.165	-0.439	-4.592	0.680	0.132	-1.690	1.046	0.473	-2.485
37	5.99	0.00	5.23	0.0	0.727	0.132	-3.898	0.488	-0.476	-5.363	0.781	0.094	-1.680	1.043	0.460	-2.150
38	3.99	0.00	3.27	0.0	0.714	-0.004	-4.000	0.696	-0.514	-5.604	0.782	0.015	-1.499	1.012	0.422	-1.917
39	2.00	0.00	1.32	0.0	0.677	-0.070	-4.314	0.743	-0.725	-6.372	0.707	0.043	-1.549	0.984	0.438	-2.189
40	-0.01	0.00	-0.65	0.0	0.710	-0.110	-4.647	0.723	-0.546	-6.548	0.828	0.015	-1.405	1.012	0.420	-1.697